

REVISION OF *EREMANTHUS* (COMPOSITAE: VERNONIEAE)¹

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ABSTRACT

Historically, *Eremanthus* s. lat. has comprised an amalgam of seven genera that exhibit the combined traits of syncephaly (secondary aggregation of heads into a glomerule), pluriseriate involucre, and achenes with a persistent pappus. Syncephaly is characteristic of the Lychnophorinae, which is considered by modern authors to be an artificial assemblage. In the present treatment *Eremanthus* includes *Vanillosmopsis*, but excludes *Albertinia*, *Chresta*, *Glaziavianthus*, *Prestelia*, *Pycnocephalum*, *Paralychnophora* (formerly *Sphaerophora*), and *Stachyanthus* (now *Argyrovernonia*). *Eremanthus* thus comprises 18 species of syncephalous trees and shrubs that are largely restricted to cerrado of the arid Central Plateau of Brazil. Additionally, six new combinations (required by the transfer of *Vanillosmopsis* taxa) are presented.

Recent studies have shown that *Eremanthus* Less. (Compositae: Vernonieae) includes both *Eremanthus* Less. (sensu Schultz-Bip.) and *Vanillosmopsis* Schultz-Bip., but excludes *Albertinia* Sprengel, *Chresta* Vell. Conc., *Glaziavianthus* G. Barroso, *Prestelia* Schultz-Bip., *Pycnocephalum* (Less.) DC., *Sphaerophora* Schultz-Bip., and *Stachyanthus* DC. (MacLeish, 1984a, 1984b, 1984c, 1985a, 1985b, and MacLeish & Schumacher, 1984). Thus, *Eremanthus* comprises 18 species of syncephalous trees and shrubs largely restricted to cerrado (sensu Eiten, 1978, 1983) of the arid Central Plateau of Brazil. This is a region dominated by woody Compositae; geographic dominance is relatively rare in the family (Heywood et al., 1977).

The name *Eremanthus* is derived from the Greek *eremos* (solitary) and *anthos* (flower bearing) in reference to the heads, which bear single flowers. *Vanillosmopsis* refers to the vanillalike odor characteristic of this group of plants. *Vanillosmopsis* is locally called *candeia*, candle, which refers to its ability to burn luminously. The close relationship between *Vanillosmopsis* and members of *Eremanthus* sensu Schultz-Bip. is frequently noted by the Brazilians who often refer to the latter as "não candeia," not a candle.

De Candolle (1836) is the only other author to combine *Eremanthus* and *Vanillosmopsis*, although he mistakenly placed them in *Albertinia*. He correctly noted that *E. incanus* and *E. elaeag-*

nus approach *Vanillosmopsis* in degree of syncephaly, number of florets per head, and achene and pappus characters; and that *V. erythropappa* and *V. polycephala* resemble *Eremanthus* in their high degree of syncephaly and, in the latter, reduced number of florets per head. In the course of the present study, numerous specimens of natural hybrids between these two genera were identified. It soon became apparent that the taxonomic distinction between *Eremanthus* and *Vanillosmopsis* was largely artificial.

Host/parasite relationships and terpenoid chemistry support the close relationship of these two groups. Dr. J. F. Hennen (pers. comm.) has noted that a rust pathogen, *Puccinia vanillosmopsidia* H. S. Jackson & Holway, has been found on *E. mattogrossensis* and on *V. erythropappa*. Because rusts (Uredinales) have evolved with their vascular plant hosts, their taxonomy may suggest relationships among vascular plant taxa (Thorne, 1979; McCain & Hennen, 1982). Urban (1973) demonstrated the systematic utility of *Puccinia* and *Vernonia* coevolution in determining subgeneric categories. Hence, a close relationship between *Eremanthus* and *Vanillosmopsis* is supported by the presence of a single rust species on members of both genera. In addition, terpenoid profiles appear to be very similar in members of *Eremanthus* and *Vanillosmopsis* (H. Schumacher, pers. comm.). Also, many authors have noted the presence of identical terpenoid

¹ Work at the University of Georgia was supported partially by National Science Foundation Grants DEB 81-13522 and DEB 79-09831. I am grateful to the Brazilian government for the opportunity to collect in Brazil and, in particular, to members of the Rio de Janeiro Jardim Botânico for generous assistance. In addition, I thank the curators of the many herbaria who loaned specimens for this project and Anna Baker, Graziela M. Barroso, Christopher Meacham, and Heiko Schumacher, who were of especial assistance.

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compounds in the two groups, which further supports a close relationship (Baker et al., 1972; Garcia et al., 1976; Vichnewski et al., 1977; Harborne & Williams, 1977; Robinson et al., 1980). The systematic utility of terpenoids in members of Vernoniae has been discussed by Abdel-Baset et al. (1971), Mabry et al. (1975), Harborne & Williams (1977), and Robinson et al. (1980).

Eremanthus can be distinguished from other syncephalous genera by a combination of characteristics (MacLeish, 1984a, 1984c). These include woody habit; indument composed primarily of stellate hairs; terminal compound cymes (rarely reduced to a cyme) of glomerules; 1–4 florets per head; 10-ribbed (rarely 20-ribbed) achenes with 3–5-seriate pappus and prominent nectary; and advanced pollen of type A (sensu Keeley & Jones, 1977). Members of *Eremanthus* have complex glomerules derived from reduction of internodes between subglomerules arranged in a compound cyme. A complete discussion of glomerulescence arrangement and derivation for *Eremanthus* and related genera can be found in chapter 1 of MacLeish (1984c). The only other syncephalous Vernoniae that approach the combination of characteristics evident in *Eremanthus* are *Paralychnophora* MacLeish and *Lychnophora* Martius (MacLeish, 1984c). However, both of these have a biseriate pappus and glomerules derived from the internode reduction of corymbose subglomerules. In addition, *Paralychnophora* is characterized by axillary, solitary glomerules and angled achenes; and *Lychnophora* by ericoid leaves and prominently twisted inner pappus series.

Among nonsyncephalous Vernoniae, *Eremanthus* appears to be related to *Vernonia* subsect. *Eremosis* (DC.) S. B. Jones (MacLeish, 1984c). This subsection also has a woody habit, congested terminal capitulescences, reduced numbers of florets per head, ribbed achenes, and pollen of type A. However, this group is distributed primarily in Central America and northern South America and has a biseriate pappus. If *Eremanthus* is derived from *Eremosis* stock, there are two Brazilian refugia that may have served as centers of diversification and dispersal: Veadeiros and Rondônia (also called “Araguaia” and “Airpuana” by Prance, 1982). Veadeiros is the current site of several locally endemic members of sect. *Nectaridium* (subg. *Vanillosmopsis*) that are virtually indistinguishable from many members of *Vernonia* subsect. *Eremosis*. Rondônia contains a single *Eremanthus* species, *E. ron-*

doniensis, which is restricted to that area and is the most unspecialized member of subg. *Eremanthus*.

TAXONOMIC HISTORY

Historically, *Albertinia* Sprengel, *Chresta* Vell. Conc., *Glaziovianthus* G. Barroso, *Pithecoseris* DC., *Prestelia* Schultz-Bip., *Pycnocephalum* (Less.) DC., *Sphaerophora* Schultz-Bip., *Stachyanthus* DC., and *Vanillosmopsis* Schultz-Bip. have been placed adjacent to or in synonymy with *Eremanthus*. These genera are restricted to the arid Central Plateau of Brazil and have not been evaluated comprehensively since Baker's (1873) treatment of Compositae in Martius's *Flora Brasiliensis*.

In 1829, Lessing established *Eremanthus* to include syncephalous trees or shrubs with one floret per head and a paleaceous pappus. At the same time he placed syncephalous trees and shrubs with (presumably) numerous florets per head, filiform pappus, and alveolate receptacles in *Albertinia* and syncephalous herbs in *Vernonia* sect. *Pycnocephalum*. Also in 1829, two species referable to *Eremanthus* s. lat. were described by Velloso as *Chresta*: *C. cordata* and *C. lanceolata*. However, the portion of *Flora Fluminensis* containing *Chresta* was not effectively published until 1881 (Carauta, 1973). Thus, de Candolle accomplished valid publication of *Chresta* in 1836 when he cited Velloso's figures, which had been published in *Florae Fluminensis Icones* (Velloso, 1831). Of the two species described by Velloso, only *C. cordata* was included by de Candolle in *Chresta* (as *C. spheroccephala*). This distinctive taxon is widespread throughout Brazil. In contrast, the figure and description of *C. lanceolata* could represent any one of several species. If one takes into account the itineraries of Velloso and contemporary collectors (Urban, 1906), *C. lanceolata* is either *Vanillosmopsis erythropappus*, *Eremanthus incanus*, *E. glomerulatus*, or *E. mattogrossensis*. Kuntze (1898) believed this taxon to be synonymous with *V. erythropappus* but provided no account of his reasoning. In the present treatment, *C. lanceolata* is excluded because of doubtful identity, and *C. cordata* is retained in *Chresta*.

Two years later, Lessing (1831) dissolved *Albertinia* when he transferred the type species into *Vernonia*, and a second taxon, correctly considered to have one floret per head, into *Eremanthus*. In 1836, de Candolle treated syncephalous taxa as five different genera. Syncephalous trees

and shrubs were included in *Albertinia* (he incorrectly assumed that the type species had a single floret per head), and syncephalous herbs were placed variously in *Chresta*, *Pycnocephalum*, *Stachyanthus*, and *Pithecoseris*. Schultz-Bipontinus (1861, 1863) recognized the error implicit in de Candolle's interpretation of the deeply pitted receptacle *Albertinia* as fused heads homologous with those found in many *Eremanthus* species. In contrast, Schultz-Bipontinus considered the heads of *Albertinia* to contain many florets, each of which is partially enclosed in a receptacle cavity, and the genus to be monotypic and closely related to *Vernonia*. However, Schultz-Bipontinus placed taxa with one (rarely three) floret(s) per head, high degrees of syncephaly, and achenes with a persistent pappus in *Eremanthus* or the newly-described *Sphaerophora* (further delimited by achene surface features), and those with three (to one) florets per head, various degrees of fusion, and achenes with a deciduous pappus in *Vanillosmopsis*, a second new genus (Schultz-Bipontinus, 1861, 1863). In 1873, Baker followed Schultz-Bipontinus in his delimitation of *Vanillosmopsis*; however, in his classification, *Eremanthus* comprised not only the species of Schultz-Bipontinus, but also those of *Sphaerophora*, *Chresta*, *Pycnocephalum*, *Preselia*, and *Stachyanthus*. Except for Barroso's (1947) transfer of herbs with yellow and red corollas to *Glaziovianthus*, and Robinson's (1980) suggested recombination of all herbaceous taxa into *Chresta*, the boundaries of *Eremanthus* and related genera have remained largely as Baker delineated in 1873.

Following Baker, curators endeavoring to identify Brazilian specimens have placed most syncephalous Vernonieae with achenes bearing a persistent pappus in *Eremanthus*. However, syncephalous heads are characteristic of Lychnophorinae, which is currently considered to be an artificial assemblage (Jones, 1977; MacLeish, 1984c). Traditionally, the distinction between *Eremanthus* and *Vanillosmopsis* has been based on the presence or absence of syncephalous heads, one versus three florets per head, and paleaceous and persistent versus filiform and deciduous pappus. In fact, the characteristic of lacking syncephaly was used to exclude *Vanillosmopsis* from Lychnophorinae (where *Eremanthus* was placed) despite generic descriptions that clearly describe *Vanillosmopsis* as including several highly syncephalous taxa (Baker, 1873; Bentham, 1873). De Candolle is the only author until now to com-

bine *Eremanthus* and *Vanillosmopsis*, although erroneously, in *Albertinia*. Currently, following de Candolle, *Eremanthus* is considered to include trees and shrubs with reddish-purple corollas, compound cymes (rarely reduced to a cyme) of glomerules, 1–4 florets per head, ribbed achenes with persistent or deciduous pappus of 3–5 intergrading series, and advanced pollen of type A (subechinolophate with elongated germinal furrows often barely separated at the poles, sensu Keeley & Jones, 1977).

De Candolle and Schultz-Bipontinus used the number of florets per head, degree of syncephaly, number of pappus series, and various achene surface features to delineate subdivisions of genera. These are good characters that readily indicate natural groups of related species. Thus, subg. *Eremanthus* includes sect. *Eremanthus* and sect. *Synglomerulus*. *Eremanthus* sect. *Eremanthus* is a group of closely related taxa (*E. glomerulatus*, *E. goyazensis*, *E. mattogrossensis*, and *E. rondoniense*) that may have arisen along an east-west gradient across southern portions of the Central Plateau (Fig. 1). This section is characterized by coriaceous leaves, a compound cyme of 10–60 glomerules, 5–100 heads per glomerule, head fusion via the interwoven pubescence of phyllaries, one floret per head, and sericeous achenes with a stramineous, coroniform, persistent, paleaceous pappus. Section *Synglomerulus* comprises *Eremanthus argenteus*, *E. auriculatus*, and *E. cinctus*. They differ from sect. *Eremanthus* primarily in reduction of the glomerulescence to a cyme (not compound) of 2–10 glomerules.

Eremanthus subg. *Vanillosmopsis* comprises two sections and is characterized by membranaceous to subcoriaceous leaves, compound cymes of more than 100 glomerules, 1–12 heads per glomerule, 1–4 florets per head, and glabrous achenes with a purple or white (rarely stramineous), not coroniform, deciduous, filiform pappus. *Eremanthus pohlii*, *E. graciellae*, and *E. brasiliensis* form sect. *Nectaridium*, which is characterized by near absence of syncephaly (heads solitary or slightly appressed basally in pairs) and is restricted to the northwestern arm of the Central Plateau. *Eremanthus capitatus*, *E. arboreus*, and *E. uniflorus* are members of sect. *Vanillosmopsis* and have 2–9 heads per glomerule, with bases slightly appressed and fused by the interwoven pubescence of the phyllaries. The first two of these species range south to north along the northeastern arm of the Plateau, and

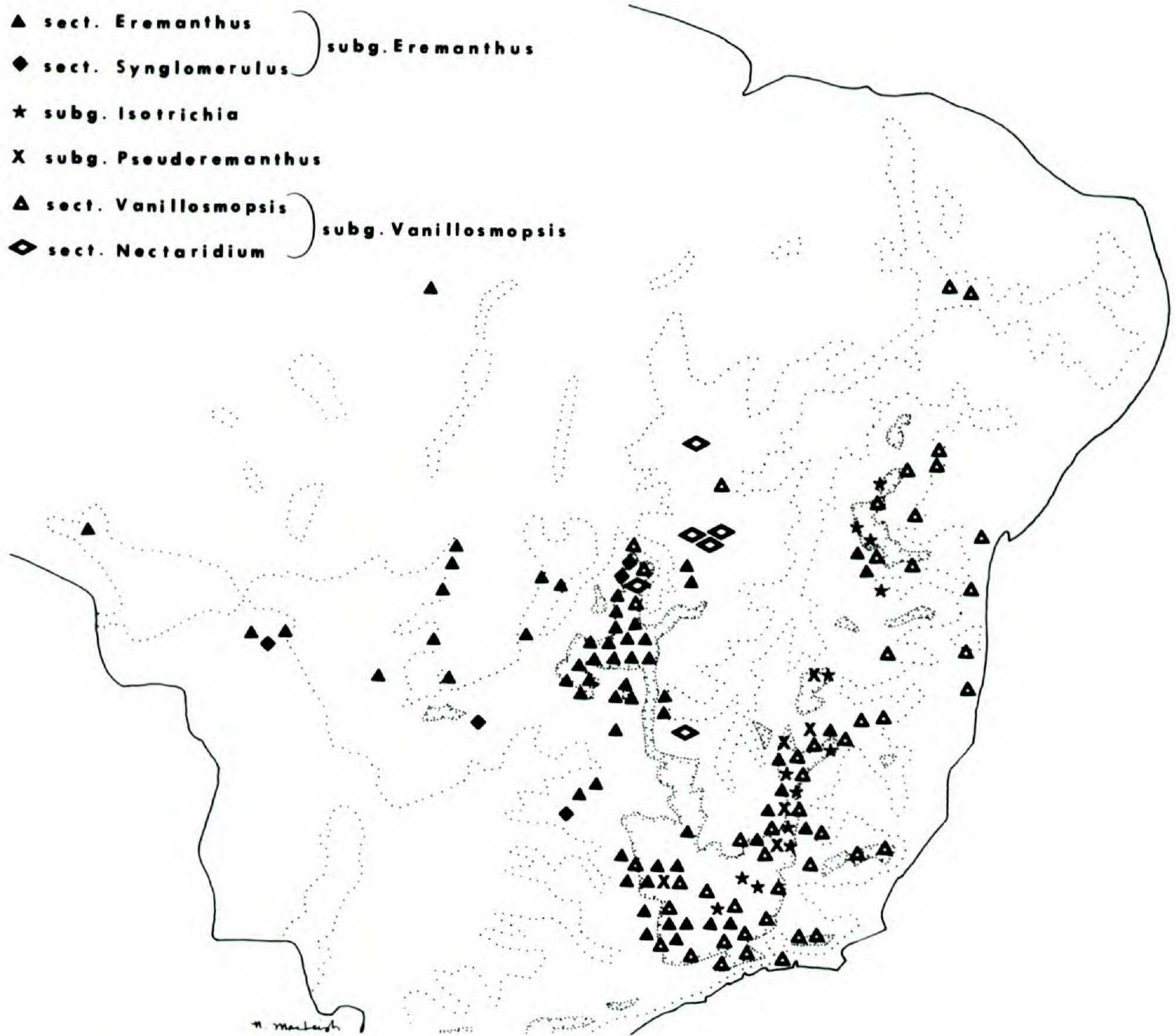


FIGURE 1. Distribution of *Eremanthus* in the Central Plateau of Brazil.

the last is restricted to the northwestern arm. *Eremanthus erythropappus* and *E. polycephalus* are also members of sect. *Vanillosmopsis* and have glomerules with 6–12 heads that are closely appressed and fused by the concrescence of phyllary and receptacle tissues. These two species are found only in the southern part of the Central Plateau.

In contrast, three species (*E. incanus*, *E. elaeagnus*, *E. seidelii*), historically assigned to *Eremanthus* s. str., exhibit characteristics intermediate to those of both subg. *Eremanthus* and subg. *Vanillosmopsis*. Not surprisingly, these species are largely restricted to the southern part of the Plateau, an area where the two major complexes are sympatric. This is also the region where a majority of hybrids are found, and it is possible that subg. *Pseuderemanthus* (*E. elaeagnus* and *E. seidelii*) and subg. *Isotrichia* (*E. incanus*) represent established hybrids between members of the major complexes.

TAXONOMIC TREATMENT

Eremanthus Less., *Linnaea* 4: 317. 1829. TYPE: *Eremanthus glomerulatus* Less.

Vanillosmopsis Schultz-Bip., *Jahresber. Pollichia* 18–19: 166. 1861. TYPE: *Vanillosmopsis glomerata* Schultz-Bip. = *Eremanthus erythropappus* (DC.) MacLeish.

Trees or shrubs to 10 m tall; stems reddish-brown lanate-tomentose or gray lepidote-tomentulose, often darkened basally by fire; branches few to many, often tortuous. Leaves cauline, alternate, strongly coriaceous to membranaceous, largely restricted to ends of branches, subsessile to petiolate; blades 2–20 cm long, 0.5–10 cm wide, narrowly elliptic to obovate, the bases acuminate to obtuse (occasionally auriculate, panduriform, or retuse), the apices acuminate to obtuse, the margins entire, adaxially glabrate to lepidote, abaxially silvery-canescens to gray-brown, lanate-tomentulose to lepidote-tomen-

tulose; trichomes stellate, the stalk with 1–2 cells; primary venation pinnate and abaxially prominent, the midrib furrowed; petioles 1–20 mm long, lanate or lepidote, base slightly expanded. Peduncles slender, to 35 cm tall, terete, reddish-brown to gray, lanate-tomentose to lepidote-tomentulose, expanded at apex; bracts foliaceous, both intra- and extraglomerular. Glomerulescence a terminal cyme of 2–20 glomerules or a compound cyme of 8–60(–100) glomerules; maturation of glomerules centrifugal. Glomerules 5–15 mm tall, 4–12 mm diam., hemispherical to spherical; head maturation concurrent to centrifugal within a glomerule. Heads homogamous, 1–100 per glomerule, closely to slightly appressed and free, or coherent by pubescence of phyllaries, or connate by concrescence of receptacle and phyllary tissues. Involucres obconic or cylindrical, 2–12 mm tall, 0.3–4 mm diam.; phyllaries in 4–7 imbricate, graduated (rarely subequal) series; innermost phyllaries deciduous at maturity; margins subscariosus, entire to subfimbriate; abaxial surfaces stramineous, often with purple apex, glabrate to lanate-tomentulose

or lepidote-tomentulose, the inner surfaces stramineous and vernicose; single vein (when present) often with mucronate extension. Florets 1–3(4) per head; corollas purple to white, 5–9 mm tall, the tube and lobes subequal; tube 2–4.5 mm tall; throat 0.5–1 mm tall; lobes 2.5–3.5 mm tall. Anthers 2–4 mm long. Pollen tricolporate with a continuous micropunctate tectum, short echinate (*Vernonia* type A). Style 4–6 mm long, 0.15–0.3 mm wide, noticeably flattened, the branches short to medium bifid, 1–2.5 mm long. Achenes cylindrical to cylindrical-turbinate (rarely turbinate), 1–4 mm tall, glandular, glabrous or sericeous, 10-ribbed (often obscurely or rarely to 20), apex constricted and dark; carpodium absent or minute; nectary 0.2–0.45 mm tall, persistent or tardily deciduous, occasionally pubescent. Pappus 3–5-seriate, of stramineous, white, or purple, strongly coroniform to not coroniform, often basally fused, persistent to promptly deciduous, paleaceous to filiform, strigose bristles; outermost series 0.4–3 mm long, innermost series 3–8 mm long. Chromosome number: $n = 15$.

KEY TO SPECIES OF *EREMANTHUS*

- 1a. Glomerulescence a compound cyme of 3–60 glomerules or a cyme of 2–20 glomerules; heads (1–)20–100 per glomerule, with phyllaries in 3–6 series; florets 1(2–4) per head; achenes cylindrical-turbinate or cylindrical, sericeous with stramineous (rarely white or purple), strongly to subcoroniform, persistent (rarely tardily deciduous), paleaceous pappus; leaves strongly coriaceous to subcoriaceous.
- 2a. Florets 1 per head; heads closely appressed, coherent either by interwoven pubescence or connate by tissue concrescence; achenes cylindrical-turbinate or cylindrical; glomerule subspherical to hemispherical.
- 3a. Achenes cylindrical-turbinate (rarely turbinate), 10-ribbed; pappus stramineous (rarely purple), coroniform, persistent, paleaceous; heads obconic (rarely cylindrical), coherent by interwoven pubescence of phyllaries (subg. *Eremanthus*).
- 4a. Glomerulescence a compound cyme of (3–)10–60 glomerules (sect. *Eremanthus*).
- 5a. Stem pubescence reddish-brown lanate-tomentose; heads 20–100 per glomerule.
- 6a. Heads coherent $\frac{1}{4}$ – $\frac{1}{2}$ length; leaves subcoriaceous, abaxially rarely lepidote-tomentose 1. *E. glomerulatus*
- 6b. Heads coherent entire length; leaves strongly coriaceous, abaxially lepidote-tomentose 2. *E. goyazensis*
- 5b. Stem pubescence gray lepidote-tomentulose; heads 5–45 per glomerule.
- 7a. Heads coherent $\frac{1}{2}$ length; leaf blades 6–16 cm long, 2–10 cm wide 3. *E. mattogrossensis*
- 7b. Heads coherent $\frac{1}{4}$ length; leaf blade 2–7 cm long, 0.5–1.5 cm wide 4. *E. rondoniensis*
- 4b. Glomerulescence a cyme (not compound) of 5–20(–30) glomerules (sect. *Synglomerulus*).
- 8a. Stem pubescence gray lepidote-tomentulose; leaf base acute to attenuate 5. *E. argenteus*
- 8b. Stem pubescence reddish-brown lanate-tomentose; leaf base variously lobed (rarely acute).
- 9a. Leaf bases auriculate, the blades 5–8 cm long, appressed-ascending; heads 30–80 per glomerule, coherent $\frac{1}{2}$ length 6. *E. auriculatus*
- 9b. Leaf bases retuse to acute, the blades 6–19 long, not appressed-ascending; heads 20–50 per glomerule, coherent entire length 7. *E. cinctus*
- 3b. Achenes cylindrical, 15–20-ribbed; pappus off-white to purple, subcoroniform, tardily deciduous, subpaleaceous; heads cylindrical, connate by concrescence of tissues (subg. *Isotrichia*) 8. *E. incanus*

- 2b. Florets 3–4 per head; heads slightly appressed, free; achenes cylindrical; glomerule hemispherical (subg. *Pseuderemanthus*).
- 10a. Heads per glomerule 1–7 9. *E. seidelii*
- 10b. Heads per glomerule 9–20 10. *E. elaeagnus*
- 1b. Glomerulescence a compound cyme of more than 100 glomerules; heads 1–12 per glomerule, with phyllaries in 5–7 series; florets 1–4 per head; achenes cylindrical (rarely cylindrical-turbinate), glabrate with a purple or white (rarely stramineous), not coroniform, promptly (rarely tardily) deciduous, filiform pappus; leaves membranaceous to subcoriaceous (subg. *Vanillosmopsis*).
- 11a. Heads solitary or in pairs slightly appressed basally, cylindrical; pappus never twisted (sect. *Nectaridium*).
- 12a. Florets 2–3 per head; involucre with prominent truncate base, phyllaries purple.
- 13a. Florets 3 per head 11. *E. pohlii*
- 13b. Florets 2 per head 12. *E. graciellae*
- 12b. Florets 1 per head; involucre without truncate base, phyllaries brown 13. *E. brasiliensis*
- 11b. Heads (2–)5–12 per glomerule, cylindrical or obconic; pappus often twisted (sect. *Vanillosmopsis*).
- 14a. Heads closely appressed and connate by tissue concrescence, 6–12 per glomerule.
- 15a. Floret 1 per head; heads coherent $\frac{1}{2}$ length 14. *E. polycephalus*
- 15b. Florets 3–4 per head; heads coherent nearly entire length 15. *E. erythropappus*
- 14b. Bases of heads slightly appressed and coherent by pubescence of phyllaries, 2–9 per glomerule.
- 16a. Florets 1 per head 16. *E. uniflorus*
- 16b. Florets 3–4 per head.
- 17a. Heads 2–5 per glomerule 17. *E. capitatus*
- 17b. Heads 6–9 per glomerule 18. *E. arboreus*

Eremanthus Less. subg. **Eremanthus**. *Eremanthus* subg. *Eueremanthus* Schultz-Bip., Jahresber. Pollichia 20–21: 393. 1863.

Leaves strongly coriaceous to subcoriaceous. Glomerulescence a compound cyme of 3–60 glomerules or a cyme of 2–20 glomerules. Glomerules subspherical to hemispherical. Heads (1–)20–100 per glomerule, obconic; with phyllaries in 3–6 series, closely appressed, coherent by interwoven pubescence of phyllaries. Florets 1 per head. Achenes cylindrical-turbinate, 10-ribbed, sericeous. Pappus stramineous (rarely purple), coroniform, persistent, paleaceous, strigose bristles.

Eremanthus Less. sect. **Eremanthus**

Glomerulescence a compound cyme of (3–)10–60 glomerules. Glomerules 5–10(–15) mm tall, 5–15 mm diam.

1. **Eremanthus glomerulatus** Less., Linnaea 4: 317. 1829. *Albertinia glomerulata* (Less.) DC., Prodr. 5: 82. 1836. TYPE: Brazil: no other data, *Sellow s.n.* (holotype, P; isotype, TEX).

Albertinia rufiseta DC., Prodr. 5: 81. 1836. TYPE: Brazil. Minas Gerais: siccis apricis montosis Serro Frio, *Martius s.n.* (holotype, M).

Albertinia pallidiseta DC., Prodr. 5: 81. 1836. *Eremanthus pallidisetus* (DC.) Schultz-Bip., Jahresber. Pollichia 18–19: 165. 1861. TYPE: Brazil. Minas Gerais: campis editis ad Calumbi Praed. Serro Frio, *Martius s.n.* (holotype, M).

Albertinia stellata Gardner, London J. Bot. 5: 235.

1846. *Eremanthus stellatus* (Gardner) Schultz-Bip., Jahresber. Pollichia 18–19: 164. 1861. *Eremanthus stellatus* (Gardner) Schultz-Bip. var. *gardneriana* Schultz-Bip., Jahresber. Pollichia 20–21: 394. 1863, nom. superfl. TYPE: Brazil. “Pernambuco” (now Bahia): Santa Rosa, district of the Rio Preto, Sept. 1839, *Gardner 2896* (holotype, BM; isotypes, 2 in F (fragment and photo of W), G, GH, K, 2 in NY).

Eremanthus stellatus (Gardner) Schultz-Bip. var. *pohliana* Schultz-Bip., Jahresber. Pollichia 20–21: 394. 1863. TYPE: Brazil, in summitate montium S. Felis prope Engenb. S. Anna, *Pohl 174* (holotype, W; isotypes, F (fragment), 2 in NY).

Slender to robust tree, 2–10 m tall, to 20 cm diam.; stems reddish-brown lanate-tomentose; branches few to many. Leaves subcoriaceous, sessile to petiolate; petioles to 10 mm long, lanate-tomentulose; blades 4–14(–20) cm long, 1–5.5(–7.5) cm wide, elliptic to ovate, the bases acute to obtuse, the apices obtuse (rarely rounded or retuse), margins entire; adaxially tomentulose to glabrate, abaxially gray-brown lanate-tomentulose (rarely lepidote-tomentulose). Peduncle slender, to 20 cm tall, ribbed, reddish-brown lanate-tomentose to gray lepidote-tomentulose. Glomerulescence a compound cyme of 20–60 glomerules. Glomerules 5–15 mm tall, 9–15 mm diam., hemispherical. Heads 20–90 per glomerule, closely appressed basally, fused $\frac{1}{4}$ to $\frac{1}{2}$ length by pubescence of phyllaries. Involucres obconic, 3.5–5.5 mm tall, 1.3–2.5 mm diam.; phyllaries in 4–6 series; outermost phyllaries narrowly obtrullate, 1.2–3 mm long, 0.4–1.6 mm wide, the apices acute; innermost phyllaries oblanceolate, 3.1–5.2 mm long, 0.6–1.4 mm wide,

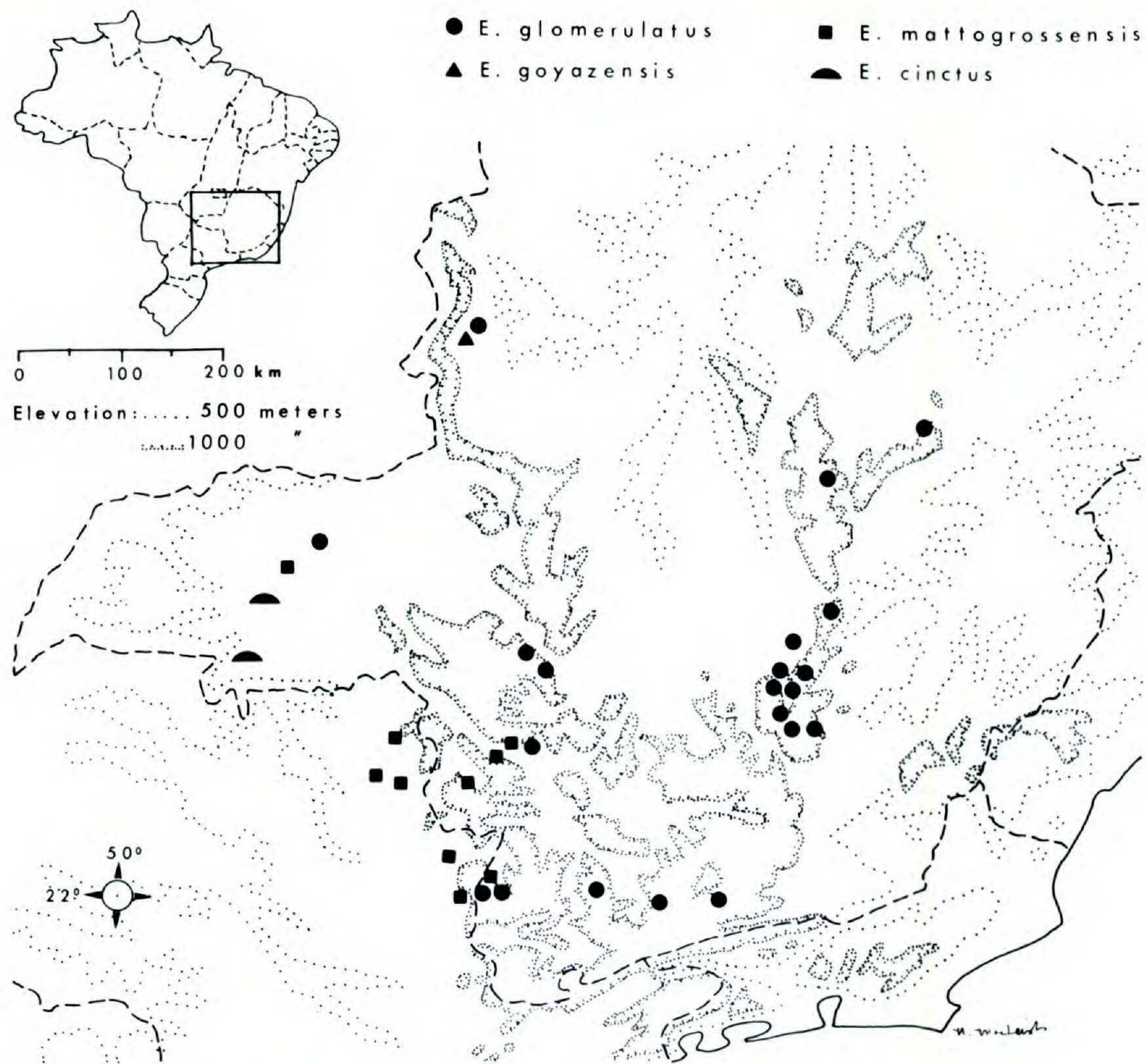


FIGURE 2. Distribution of *Eremanthus* subg. *Eremanthus* in Minas Gerais.

the apices acute; margins entire; abaxial surfaces stramineous with purple apex, glabrate to lanate-tomentulose. Corollas purple to white, 4–7.8 mm tall, the lobes acuminate. Anthers 2–3.4 mm long, the apical appendage acuminate to rounded, the bases obtuse to rounded. Achenes 2.5–4.1 mm tall, glandular, sericeous between the 10 ribs, the apex slightly constricted; nectary 0.15–0.25 mm tall, tardily deciduous. Pappus 4–5-seriate, of strongly coroniform (at maturity) strigose bristles; outermost series 1–2.2 mm long; innermost series 4–6.2 mm long.

Flowering and fruiting occur from March to October.

Eremanthus glomerulatus is distributed throughout Minas Gerais, Goiás, and adjacent regions in Bahia and São Paulo (Figs. 2, 3, 6), at altitudes of 700 to 1,500 meters. It is found commonly in large colonies and may dominate cerrado and campo rupestre habitats. In Minas Gerais, this species often is used for fence posts because of its abundance.

Eremanthus glomerulatus is the eastern mem-

ber of a group of closely related taxa (sect. *Eremanthus*) found throughout the Central Plateau. *Eremanthus goyazensis* is slightly more robust with a greater fusion of heads and is found in the northcentral branch of the Plateau. In contrast, *E. mattogrossensis* is less robust and has lepidote-tomentose (rather than lanate-tomentose) stems and leaves; it extends throughout the western arm and into the southwestern side. *Eremanthus rondoniense* is closely related to *E. mattogrossensis* and is restricted to the far western portions of the western arm. *Eremanthus glomerulatus* appears to be the member of this complex most closely related to the taxa historically considered to compose *Vanillosmopsis*. The subcoriaceous leaves, strongly ribbed achenes, and occasionally purple pappus of *E. glomerulatus* are reminiscent of characteristics found in the transitional taxa, *E. incanus*, *E. elaeagnus*, and *E. seidelii*. In addition, it is the only member of this complex that is sympatric with both the transitional taxa and the majority of the *Vanillosmopsis* complex.

The many epithets ascribed to *E. glomerulatus*

represent variations in pappus color (purple or white) and number of series, branch position (angular or not), and leaf shape. *Eremanthus glomerulatus* can be found throughout most of the Central Plateau, and the observed variation can be attributed to maturity and habitat differences. These epithets were applied by earlier authors who were attempting to identify Brazilian collections in the absence of adequate documentation. Baker (1873) was the first author to recognize *E. glomerulatus* as a widespread and slightly variable species.

The Paris specimen of *E. glomerulatus* is clearly the holotype. It is annotated appropriately by both Lessing and Schultz-Bipontinus and matches the description given by Lessing in 1829. Originally both the Paris specimen and the Texas specimen were housed in Berlin because both are stamped "hb. berol."

Additional specimens examined. BRAZIL. BAHIA: Rio das Contas, 22 Jul. 1979, *King et al.* 8099 (US). DISTRITO FEDERAL: Gama, 28 Aug. 1965, *Irwin et al.* 7926 (MO, NY, US). GOIÁS: Cristalina, 3 Apr. 1973, *Anderson* 8004 (F, MO, NY, UB, US). MINAS GERAIS: Nova Lima, 15 Apr. 1945, *Williams & Assis* 6626 (F, GH, MO, NY, S).

Possible hybrids. × *E. elaeagnus* (C. Martius ex DC.) Schultz-Bip. MINAS GERAIS: Serra do Cipó, 7 Oct. 1980, *MacLeish et al.* 715 (BR, F, GA, GH, K, M, MO, NY, RB, S, US), 7 Oct. 1980, *MacLeish et al.* 716 (GA, RB), 30 Jan. 1980, *King & Almeda* 8354 (US). × *E. mattogrossensis* Kuntze. MINAS GERAIS: Sacramento, 22 Jul. 1980, *Schumacher* B10 (GA). × *E. seidelii* MacLeish & Schumacher. MINAS GERAIS: between Furnas and Piuí, 25 Aug. 1981, *Schumacher* 1008 (GA).

2. *Eremanthus goyazensis* (Gardner) Schultz-Bip., *Jahresber. Pollichia* 18–19: 165. 1861. *Albertinia goyazensis* Gardner, *London J. Bot.* 6: 425. 1847. TYPE: Brazil. Goiás: hilly campos near Villa de Arrayas, Apr. 1840, *Gardner* 3804 (holotype, BM; isotypes, 2 in F (fragment and photo of B), 3 in G, GH (photo of B), 3 in NY, TEX (photo of B), W).

Eremanthus weddellii Schultz-Bip., *Jahresber. Pollichia* 18–19: 165. 1861. TYPE: Brazil, Goiás, env. in Salinas, May 1844, *Weddell* 2032 (holotype, P).

Small tree, 1–3 m tall, the trunk often gnarled; stems reddish-brown to gray-black lanate-tomentose, to 8 cm diam.; branches few. Leaves strongly coriaceous, sessile to petiolate; petioles to 10 mm long, lanate-tomentose; blades 7.5–

18 cm long, 3.5–10 cm wide, elliptic to ovate, the bases obtuse, the apices obtuse to rounded (rarely retuse), the margins entire; adaxially sparsely lepidote to glabrate; abaxially gray-brown lepidote-tomentose. Peduncle slender, to 20 cm tall, ribbed, gray-brown lepidote-tomentose. Glomerulescence a compound cyme of 10–40 glomerules. Glomerules 5–15 mm tall, 7–15 mm diam., hemispherical. Heads 25–100 per glomerule, closely appressed, coherent entire length by lanose pubescence of phyllaries. Involucres obconic, 2–4.6 mm tall, 0.5–1.5 mm diam.; phyllaries in 3–4 series; outermost phyllaries narrowly obtrullate, 1.8–3.2 mm long, 0.2–0.8 mm wide, the apices acute to acuminate; innermost phyllaries oblanceolate, 2.9–4.8 mm long, 0.3–0.8 mm wide, the apices acute; margins entire; abaxial surfaces stramineous, glandular, glabrate to lanose-tomentose. Corollas pale purple to white basally, 5.2–8.2 mm tall, the lobes acuminate. Anthers 2.4–4.4 mm long, the apical appendage acuminate; bases obtuse to rounded. Achenes 2–2.8(–3.8) mm tall, glandular, sericeous between 10 ribs, often obscurely ribbed; apex slightly constricted; nectary 0.25–0.35 mm tall, tomentose, tardily deciduous. Pappus 4–5-seriate, of strongly coroniform (at maturity) strigose bristles; outermost series 0.8–2.3 mm long, the innermost series 4.6–6 mm long. Chromosome number: $n = 15$.

Flowering and fruiting occur from January to September.

Eremanthus goyazensis is distributed throughout southern Goiás and nearby Minas Gerais (Figs. 2, 3). It is infrequent in cerrado and campo rupestre at altitudes of 700 to 1,600 meters.

Eremanthus goyazensis is the northcentral extension of the *glomerulatus* complex. It is distinguished from *E. glomerulatus* by its strongly coriaceous leaves with abaxial lepidote-tomentose surfaces and heads entirely coherent by interwoven pubescence. In addition, it can be easily distinguished from the *mattogrossensis-rondoniense* complex by its lanate stem pubescence, 25–100 heads per glomerule, and high degree of cohesion.

Additional specimens examined. BRAZIL. DISTRITO FEDERAL: Chapada da Contagem, 18 Aug. 1964, *Irwin & Soderstrom* 5287 (NY, TEX, UB). GOIÁS: Terezina, 18 Mar. 1973, *Anderson* 7354 (F, MO, NY, UB, US).

3. *Eremanthus mattogrossensis* Kuntze, *Revis. Gen. Pl.* 3(2): 145. 1898. TYPE: Brazil: "Mat-

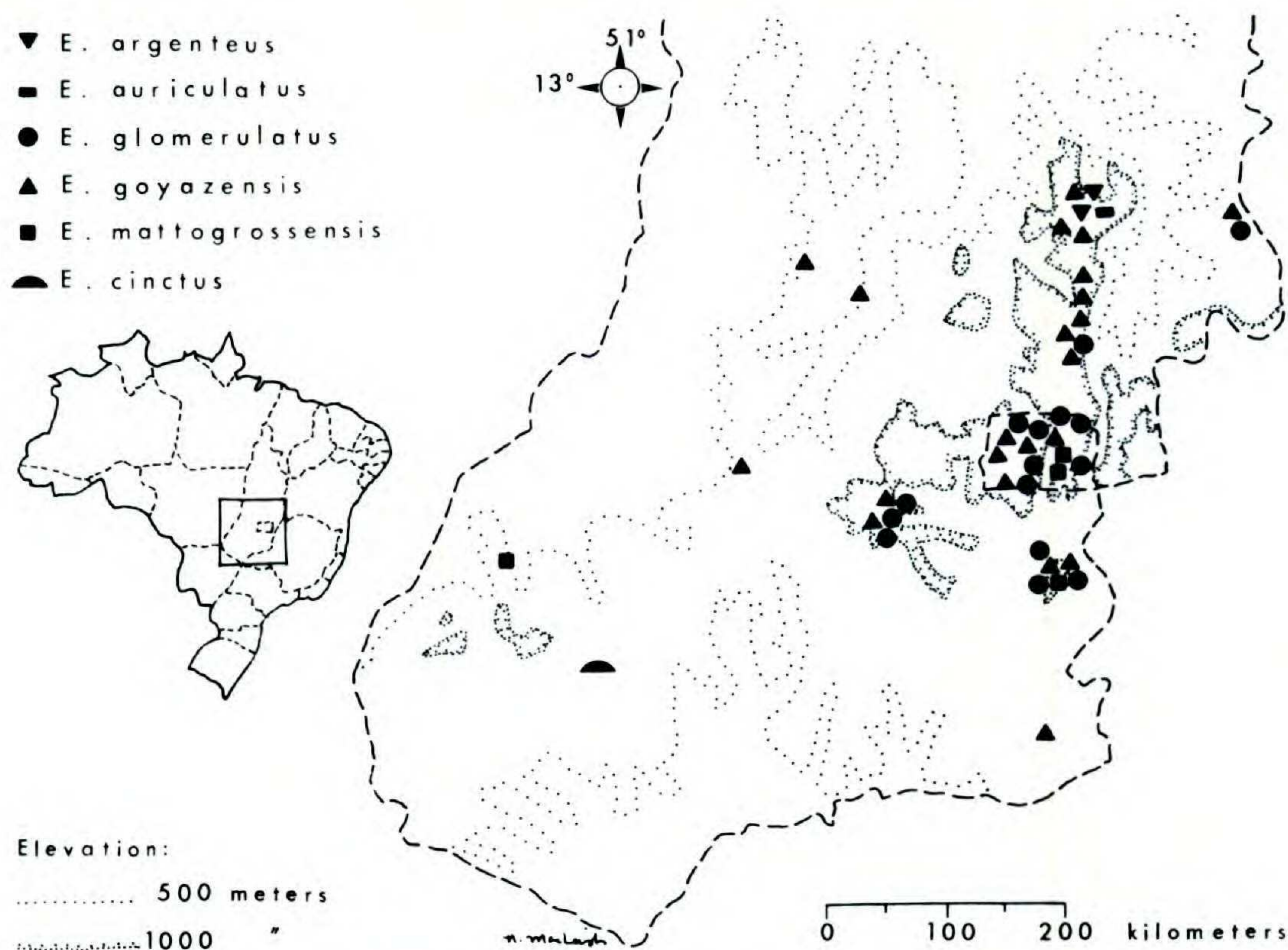


FIGURE 3. Distribution of *Eremanthus* subg. *Eremanthus* in Goiás.

togrosso" (now Mato Grosso): Jul. 1892, Kuntze s.n. (holotype, NY; isotypes, photos of B, F, GH, TEX).

Shrub or slender tree, 1–4 m tall; stems gray-brown lepidote-tomentulose; branches few. Leaves coriaceous, sessile to petiolate; petioles to 15 mm long, lepidote; blades 6–16 cm long, 2–10 cm wide, elliptic to narrowly elliptic, the bases acute to acuminate, the apices acute to rounded, the margins entire; adaxially sparsely lepidote to glabrate, abaxially gray lepidote-tomentulose. Peduncle slender, to 32 cm tall, ribbed, gray-brown lepidote-tomentulose. Glomerulescence a compound cyme of 6–35 (–80) glomerules. Glomerules 4.5–10 mm tall, 5.5–12 mm diam., subspherical. Heads 10–45 per glomerule, closely appressed basally, coherent $\frac{1}{2}$ length by pubescence of phyllaries. Involucres cylindric, 2.3–4 mm tall, 1.1–2.4 mm diam.; phyllaries in 5–6 series; outermost phyllaries narrowly obtrullate, 1.3–2.3 mm long, 0.2–0.6 mm wide, the apices acute; innermost phyllaries oblanceolate, 1.8–3.4 mm long, 0.5–0.9 mm wide, the apices acute; margins entire; abaxial surfaces stramineous, glabrate to lepidote-tomentulose. Corollas pale purple to white, 4.4–7.6 mm tall, the lobes acuminate. Anthers 2.1–3.4 mm long, the apical appendage acuminate to acute, the bases obtuse to rounded. Achenes 2–3 mm tall, glandular, sericeous between ribs, 10–

ribbed (often obscurely), the apex slightly constricted; nectary 0.15–0.25 mm tall, tomentose, tardily deciduous. Pappus 3–5-seriate, of strongly coroniform (at maturity) strigose bristles; outermost series 0.8–3.1 mm long; innermost series 3.3–6 mm long.

Flowering and fruiting occur from April to August.

Eremanthus mattogrossensis is widely distributed throughout the western section of the Central Plateau of Brazil (Figs. 2–4) at elevations of 500 to 1,000 meters in cerrado. It is particularly common in Mato Grosso, where it is called "veludo do cerrado," velvet of the cerrado, or "casca freta," cleft bark.

Eremanthus mattogrossensis is transitional between *E. goyazensis* and *E. rondoniense* and is intermediate in geographical location. All three are found within the western arm of the Central Plateau. *Eremanthus rondoniense* is restricted to the far western portion of the Serra dos Parecis near the border of Mato Grosso and Rondônia, and *E. goyazensis* is restricted to eastern portions of the western arm (principally southern Goiás).

The type specimen, bearing only the citation "Mattogrosso," must have been collected in western Mato Grosso, near Rondônia. Zanoni (1980), in his excellent survey of Kuntze's collecting trips, pointed out that Kuntze entered Brazil through Bolivia and explored only a small

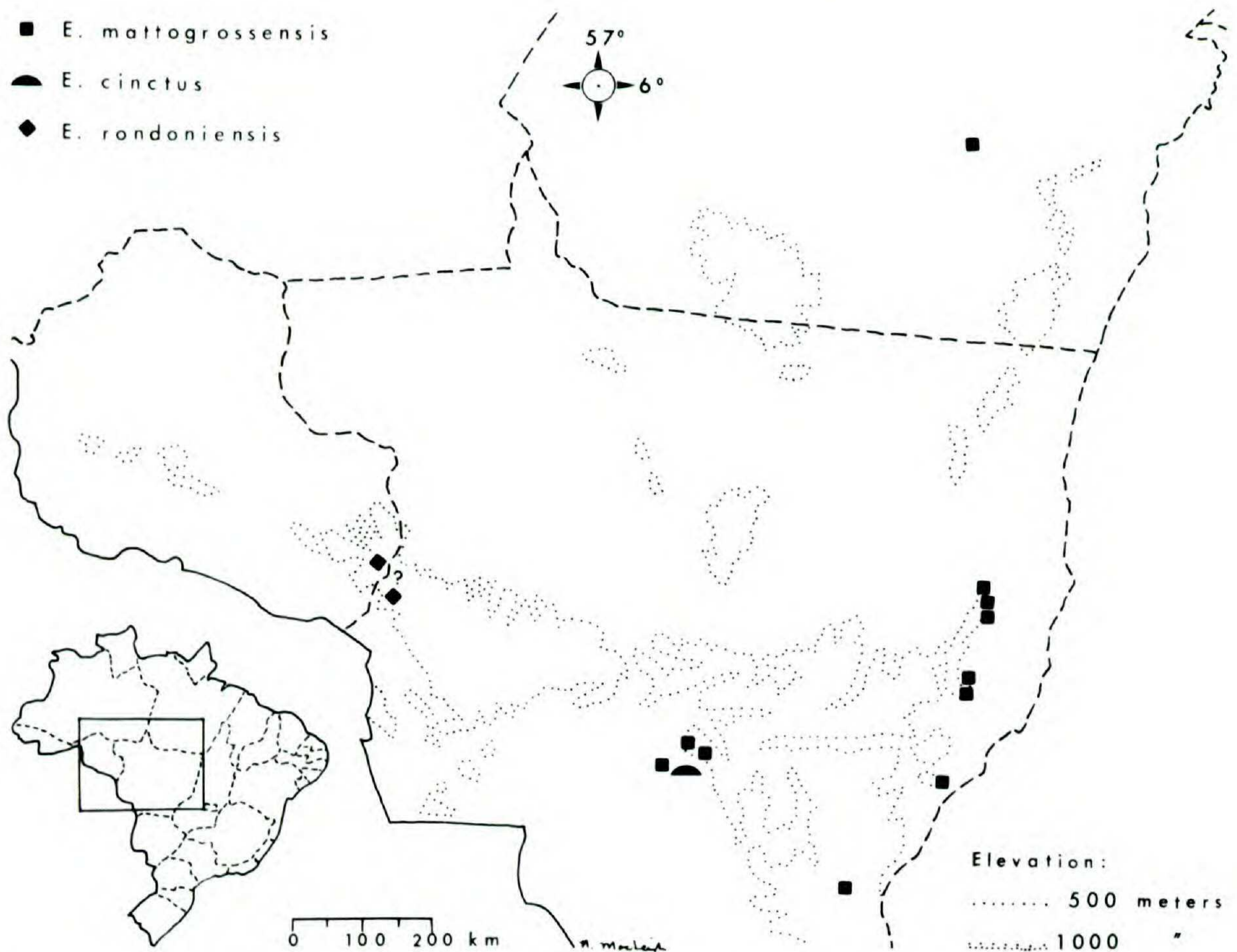


FIGURE 4. Distribution of *Eremanthus* subg. *Eremanthus* in western Central Plateau.

area of Mato Grosso near the border. Zanoni also noted that the bulk of Kuntze's personal herbarium, including many type specimens, is at the New York Botanical Garden. Thus, their specimen of *E. mattogrossensis*, which bears the appropriate collecting information in Kuntze's handwriting and which matches his type description, is likely the holotype.

Additional specimens examined. BRAZIL. DISTRITO FEDERAL: Brasília, 15 Jun. 1981, *Heringer et al.* 7057 (MO). GOIÁS: 75 km from Aragarças, near Piranhas, 23 Jun. 1966, *Hunt & Ramos* 6160 (MO, NY, UB). MATO GROSSO: Barra do Garças, 6 May 1973, *Anderson* 9801 (G, MO, NY, UB). MINAS GERAIS: Furnas, 5 Jul. 1982, *Schumacher* 2008, 2009, 2010, 2012, 2014 (GA, MB). PARÁ: São Felix do Xingu, 12 Jul. 1978, *Rosario* 68 (RB, NY). SÃO PAULO: inter Cana Verde et S. José, *Regnell III.670* (BR, S).

Possible hybrids. × *E. glomerulatus* Less. MINAS GERAIS: Sacramento, 22 Jul. 1980, *Schumacher* B10 (GA). × *E. seidelii* MacLeish & Schumacher. MINAS GERAIS: between Furnas and Piuí, 25 Aug. 1981, *Schumacher* 1003, 1004 (GA).

4. ***Eremanthus rondoniensis*** MacLeish & Schumacher, *Syst. Bot.* 9: 89. 1984. TYPE: Brazil. Rondônia: Vilhena, 13°16'S, 58°52'W, 18 Apr. 1977, *Bantel & Silva s.n.* (holotype, RB).

Small tree, ca. 1 m tall; stems gray-brown lepidote-tomentulose, often basally darkened by fire. Leaves coriaceous, sessile to petiolate; petioles to 5 mm long, lepidote; blades 2–7 cm long, 0.5–1.4 cm wide, narrowly elliptic, the bases obtuse, the apices obtuse; margins entire; adaxially sparsely lepidote to glabrate, abaxially gray-brown lepidote-tomentulose. Peduncle slender, height unknown, terete, gray-brown lepidote-tomentulose. Glomerulescence a compound cyme of 3–20 glomerules. Glomerules 5–7 mm tall, 7–10 mm diam., hemispherical. Heads 5–15 per glomerule, closely appressed, coherent $\frac{1}{4}$ length by pubescence of phyllaries. Involucres obconic, 3.5–5 mm tall, 1–2.2 mm diam.; phyllaries in 4–6 imbricate graduated series; outermost phyllaries widely trullate, 1.4–2.1 mm long, 0.5–0.7 mm wide, the apices obtuse; innermost phyllaries oblanceolate, 2.4–4 mm long, 0.8–1 mm wide, the apices acute; margins entire; abaxial surfaces stramineous with purple apex, glabrate to lepidote-tomentulose. Corollas white, 5.1–6 mm tall, the lobes acuminate. Anthers 2.6–3 mm long, the apical appendage acuminate, the bases rounded. Achenes turbinate, 1.9–2.2 mm tall, glandular, obscurely-ribbed, the base sericeous, the apex constricted with prominent dark collar;

nectary 0.2–0.5 mm tall. Pappus 3–5-seriate, of strongly coroniform (at maturity) strigose bristles; outermost series 0.6–1.8 mm long; innermost series 5–6.8 mm long.

Flowering and fruiting occur from April to July.

Eremanthus rondoniensis is distributed along the Rondônia-Mato Grosso border in the western portion of the Serra dos Parecis (Fig. 4). It is found in periodically burned cerrado. *Eremanthus rondoniensis* is closely related to *E. mattogrossensis* and represents a western extension of the *glomerulatus-goyazensis-mattogrossensis* complex.

Additional specimens examined. BRAZIL. MATO GROSSO (latitude and longitude indicate Rondônia): 12°38'S, 60°8'W, 5 Jul. 1977, *Olivieira s.n.* (RB). RONDÔNIA (latitude and longitude indicate Mato Grosso): Vilhena, 13°46'S, 59°50'W, 17 Apr. 1977, *Bantel & Silva s.n.* (RB).

***Eremanthus* sect. *Synglomerulus* MacLeish, sect. nov.** TYPE: *Eremanthus argenteus* MacLeish & Schumacher.

Glomerulescentiae cymosae. Glomerulis 5–10(–30); (5–)10–25 mm longis, 10–25 mm diam.

5. ***Eremanthus argenteus* MacLeish & Schumacher, Syst. Bot. 9: 84. 1984.** TYPE: Brazil. Goiás: 33 km N of Alto Paráiso towards Cavalcante, 1,370 m, 14 Oct. 1980, *MacLeish, Martinelli, Smith & Stutts 734* (holotype, RB; isotypes, F, G, GA, GH, MO, NY, UB, US).

Slender tree, 2–3 m tall; stems ash gray lepidote-tomentulose; branches few. Leaves coriaceous, sessile to petiolate; petioles to 5 mm long, lepidote-tomentulose; blades 7.5–14(–18) cm long, 2.5–6 cm wide, elliptic, the bases acute to attenuate, the apices rounded to obtuse, the margins entire; adaxially silvery lepidote; abaxially silvery lepidote-tomentulose. Peduncle slender, to 30 cm tall, terete, ash gray lepidote-tomentulose. Glomerulescence a cyme of 6–20 glomerules. Glomerules 5–20 mm tall, 10–25 mm diam., subspherical. Heads 10–80 per glomerule, closely appressed, coherent for $\frac{2}{3}$ their lengths by pubescence of phyllaries. Involucre obconic, 3.5–5 mm tall, 1–2.5 mm diam.; phyllaries in 4–5 series; outermost phyllaries narrowly obtrullate, 1.7–2.9 mm long, 0.4–0.8 mm wide, the apices acute; innermost phyllaries narrowly obtrullate, 3.6–5.1 mm long, 0.5–1.1 mm wide, the

apices acuminate; margins entire to subfimbriate; abaxial surfaces stramineous with purple apex, glandular, glabrate to tomentose. Corollas purple, 5.2–7.4 mm tall, the lobes acuminate. Anthers 3–3.6 mm long, the apical appendage acuminate to acute, the bases acute to obtuse. Achenes 2.5–4 mm tall, glandular, sericeous, obscurely ribbed, the apex slightly constricted; nectary 0.2–0.5 mm tall. Pappus 3–5-seriate, of coroniform (at maturity); strigose bristles; outermost series 1–2.5 mm long; innermost series 5–7 mm long.

Flowering and fruiting occur from July to October.

Eremanthus argenteus is found only in the Chapada dos Veadeiros of southcentral Goiás (Fig. 3). Although common, it is restricted to the granite outcrops of campo rupestre at high altitudes.

This species resembles *E. cinctus* and *E. auriculatus* which also show glomerulescence reduction to a cyme of glomerules from the compound cyme, which is more typical of sect. *Eremanthus*. *Eremanthus argenteus* is easily separated from both species by its silvery lepidote surfaces and absence of auriculate or retuse leaf bases and apiculate phyllaries. At present, it does not appear to be related to any particular species of *Eremanthus*.

Additional specimens examined. BRAZIL. GOIÁS: Brasília Richtung Campos Belos, 22 km nach Alto Paráiso, 1,500 m, 28 Aug. 1981, *Schumacher 1035* (GA, K, M, MB, RB, W).

Possible hybrids. × *E. uniflorus* MacLeish & Schumacher. GOIÁS: Alto Paráiso, 28 Aug. 1981, *Schumacher 1038, 1039, 1041* (GA).

6. ***Eremanthus auriculatus* MacLeish & Schumacher, Syst. Bot. 9: 86. 1984.** TYPE: Brazil. Goiás: Brasília Richtung Campos Belos, 22 km nach Alto Paráiso, 1,500 m, 28 Aug. 1981, *Schumacher 1037* (holotype, RB; isotypes, GA, MB).

Shrub to small tree, 0.8–1.5 m tall; stems reddish-brown lanate-tomentose; branches few. Leaves coriaceous, sessile, conspicuously ascending-appressed; blades 5–8 cm long, 2–3 cm wide, trullate to ovate, the bases auriculate, the apices acute, the margins entire; adaxially tomentulose, abaxially gray-brown lanate-tomentose. Peduncle slender, to 20 cm tall, ribbed, reddish-brown lanate-tomentose. Glomerulescence

a cyme (rarely compound) of 9–20 glomerules. Glomerules 5–15 mm tall, 15–20 mm diam., subspherical. Heads 30–80 per glomerule, closely appressed basally, coherent $\frac{1}{2}$ length by lanate pubescence of phyllaries. Involucres obconic, 4–5.5 mm tall, 1.5–2.5 mm diam.; phyllaries in 4–5 series; outermost phyllaries narrowly obtrullate, 2.3–4 mm long, 0.4–0.7 mm wide, the apices acute; innermost phyllaries narrowly obtrullate, 4.2–4.6 mm long, 0.5–0.8 mm wide, the apices apiculate; margins entire to subfimbriate; abaxial surfaces stramineous with purple apex, often axially green, tomentulose to lanate. Corollas purple, 5.5–7 mm tall, the lobes acuminate to acute, sparsely glandular. Anthers 3.3–3.6 mm long, the apical appendage acute, the bases acuminate. Achenes 3–3.6 mm tall, glandular, sericeous, obscurely-ribbed, apex slightly constricted; nectary 0.2–0.5 mm tall. Pappus 3–5-seriate, of coroniform (at maturity) strigose bristles; outermost series 1.2–2.2 mm long; innermost series 5.5–7 mm long.

Flowering and fruiting occur from July to September.

Eremanthus auriculatus is known only from the Chapada dos Veadeiros in southcentral Goiás (Fig. 3). It occurs on campo rupestre adjacent to the cerrado characteristic of this region.

This species superficially resembles *E. cinctus*; however, *E. auriculatus* is distinguished by ascending coriaceous leaves with auriculate bases, apiculate phyllaries, and partial coherence of heads. *Eremanthus auriculatus* appears to be related to *E. glomerulatus* and *E. goyazensis* and represents a further reduction in glomerulescence internodes from a compound cyme to form a cyme of glomerules. It is easily separated from the *glomerulatus*-complex by the cyme of glomerules (vs. compound cyme), by auriculate leaf bases (vs. acute to obtuse), and by apiculate phyllaries (vs. acute to acuminate).

Additional specimen examined. BRAZIL. GOIÁS: Alto Paraíso, 4 Jul. 1983, Schumacher 3045 (GA, MB).

7. ***Eremanthus cinctus*** Baker in C. Martius, Fl. Bras. 6(2): 162. 1873. TYPE: Brazil. Mato Grosso: "Cuyaba" (now Cuiabá), 1834, *Silva Manso* 55 (holotype, BR).

Eremanthus pandurifolius Baker in C. Martius, Fl. Bras. 6(2): 162. 1873. TYPE: Brazil, no other data, *Tamberlik s.n.* (holotype, W; photos of W, F, TEX).

Shrub or small tree, 0.5–4 m tall; stems red-

dish-brown lanate-tomentose; branches few. Leaves subcoriaceous, sessile; blades 6–19 cm long, 2–6 cm wide, elliptic, narrowly elliptic, or obovate, the bases retuse to acute, the apices acute to obtuse, the margins entire; adaxially glabrate, abaxially tomentulose. Peduncle robust, to 15 cm tall, ribbed, reddish-brown lanate-tomentose; 3–9 bracts with prominently enlarged bases surrounding each glomerule. Glomerulescence a cyme (rarely compound) of 5–30 glomerules. Glomerules 10–25 mm tall, 10–25 mm diam., hemispherical. Heads 20–50 per glomerule, closely appressed, coherent entire length by lanate pubescence of phyllaries. Involucres obconic, 3.5–5 mm tall, 0.7–2 mm diam.; phyllaries in 4–5 subequal series; outermost phyllaries oblanceolate, 3.3–4.3 mm long, 0.5–0.7 mm wide, apices obtuse; innermost phyllaries oblanceolate, 3–4.8 mm long, 0.7–1 mm wide, apices acute; margins entire; abaxial surfaces stramineous with purple apex, glabrate to lanate-tomentose. Corollas white to purple, 6.2–7.2 mm tall, lobes acuminate and glandular. Anthers 4–4.4 mm long, apical appendage acuminate, bases acute. Achenes 2.5–3.5 mm tall, glandular, sericeous between 10 ribs, apex slightly constricted and dark; nectary 0.1–0.2 mm tall. Pappus 3–4-seriate, of stramineous (occasionally rusty on dried specimens), coroniform (at maturity) strigose bristles; outermost series 1.5–2.5 mm long; innermost series 5.5–7.5 mm long.

Flowering and fruiting occur from April to September.

Eremanthus cinctus is known only from three locations: western Minas Gerais, western Goiás, and near Cuiabá in central Mato Grosso (Figs. 2–4). Schumacher was able to locate this species in southwestern Goiás, but reported (pers. comm.) that the Minas Gerais locations cited by Goodland on his 1967 collections have been completely logged for charcoal.

Baker (1873) separated *E. pandurifolius* from *E. cinctus* on the basis of a solitary glomerule versus a cyme of glomerules. This distinction is artificial—the type specimen of *E. pandurifolius* is fragmented, making the glomerules appear solitary. *Eremanthus pandurifolius* appears to have been collected in western Minas Gerais, because that is the region Tamberlik is known to have explored (Urban, 1906). Likewise, Silva Manso was known to have been practicing medicine in Cuiaba during the year recorded on the label of the type specimen of *E. cinctus*. Although

E. cinctus and *E. pandurifolius* were published simultaneously, *E. cinctus* has been chosen because the type specimen is intact, whereas that of *E. pandurifolius* is badly fragmented. Until recently *E. cinctus* appeared to have a disjunct distribution since there were no collections from intervening mountainous regions, particularly Serra do Verdinho, Serra das Araras, and Serra da São Jeronimo.

Eremanthus cinctus superficially resembles *E. auriculatus* but is distinguished by subcoriaceous leaves with acute to retuse bases, several prominent extraglomerular bracts, and total fusion of heads. By contrast, *E. auriculatus* has coriaceous leaves with prominent auriculate bases, and heads appressed only at the bases. *Eremanthus cinctus*, like *E. auriculatus*, is clearly related to *E. glomerulatus*, and represents a further reduction in glomerulescence internodes from a compound cyme to form a cyme of glomerules.

Additional specimens examined. BRAZIL. MATO GROSSO: known only from the type specimen. MINAS GERAIS: 36 km N of Frutal on BR-14, 9 Aug. 1967, Goodland 3766 (UB). Prata, 29 Sep. 1967, Goodland 4001 (MO). GOIÁS: Montividiu towards Amorinópolis, 21 km after Montividiu, 800 m, 28 Apr. 1984, Schumacher 4004 (GA, MB, UNICAMP).

Eremanthus Less. subg. **Isotrichia** (DC.)

MacLeish, comb. nov. *Albertinia* Sprengel sect. *Isotrichia* DC., Prodr. 5: 82. 1836. *Vanillosmopsis* Schultz-Bip. subg. *Isotrichia* (DC.) Schultz-Bip., Jahresber. Pollichia 18–19: 168. 1861. LECTOTYPE, here designated: *E. incanus* (Less.) Less.

Leaves coriaceous. Glomerulescence a compound cyme of 8–50 glomerules. Glomerules subspherical. Heads per glomerule 30–100, cylindrical, connate by concrecence of tissues, with phyllaries in 4–6 series. Florets 1 per head. Achenes cylindrical, 15–20-ribbed, sericeous. Pappus off-white to purple, subcoroniform, tardily deciduous, subpaleaceous.

8. **Eremanthus incanus** (Less.) Less., Linnaea 6: 682. 1831. *Albertinia incanus* Less., Linnaea 4: 342. 1829. *Cacalia incana* (Less.) Kuntze, Revis. Gen. Pl. 2: 970. 1891. LECTOTYPE, here designated; Brazil, no other data, Sellow s.n. (B; isoelectotypes, BR, F (fragment from P)).

Slender to robust tree, 2–10 m tall, to 15 cm diam.; stems gray-brown lepidote; branches few. Leaves coriaceous, petiolate; petioles 4–17 mm

long, lepidote; blades 5.5–14 cm long, 2–6 cm wide, elliptic to ovate, the bases acute, the apices rounded to obtuse, the margins entire; adaxially glabrate, abaxially gray lepidote. Peduncle slender, to 27 cm tall, terete, gray lepidote. Glomerulescence a compound cyme of 8–50 glomerules. Glomerules 5–15 mm tall, 7–15 mm diam., spherical. Heads 30–100 per glomerule, closely appressed, connate nearly entire length by concrecence of phyllary tissues. Involucre cylindrical, 2.4–5 mm tall, 0.3–1.5 mm diam.; phyllaries in 4–5 series; outermost phyllaries triangular, 1.7–3 mm long, 0.1–0.5 mm wide, the apices acute to obtuse; innermost phyllaries narrowly obtrullate, 2.6–4 mm long, 0.3–0.6 mm wide, the apices acuminate, the margins entire; abaxial surfaces stramineous with purple apex, glabrate to lepidote-tomentulose. Corollas pale purple to white, 4.2–6.6 mm tall, the lobes acuminate. Anthers 2.2–2.7 mm long, the apical appendage acuminate, the bases acute. Achenes cylindrical, 2.2–2.6 mm tall, glandular, sparsely sericeous, 15–20-ribbed, the apex slightly constricted; nectary 0.15–0.25 mm tall. Pappus 3–4-seriate, off-white to purple, subcoroniform (at maturity), tardily deciduous, subpaleaceous, strigose bristles; outermost series 1–1.5 mm long; innermost series 5–5.8 mm long.

Flowering and fruiting occur from July to October.

Eremanthus incanus is distributed throughout the southern section and northeastern arm (Figs. 5, 6) of the Central Plateau of Brazil at elevations of 800 to 1,850 meters in cerrado, secondary forest, or caatinga. It is particularly common in Minas Gerais where it is called “pão candeia” (candlestick) or “candeia da serra” (mountain candle), names normally attributed to subg. *Vanillosmopsis*.

Eremanthus incanus is transitional between subg. *Eremanthus* and subg. *Vanillosmopsis*. It approaches *E. glomerulatus* in its coriaceous leaves, fewer than 100 heads per glomerule, single floret per head, large sericeous achenes, and subpaleaceous pappus. In contrast, in its lepidote tomentum, relatively small glomerules, phyllary tissue fusion, cylindrical achenes, and off-white to purple, tardily deciduous pappus it approaches *E. erythropappus* of the *Vanillosmopsis* complex.

Lessing's specimens were deposited at Char-kow. Because Lessing's original material was unavailable, a Sellow collection from B herbarium that bears appropriate annotations by Lessing

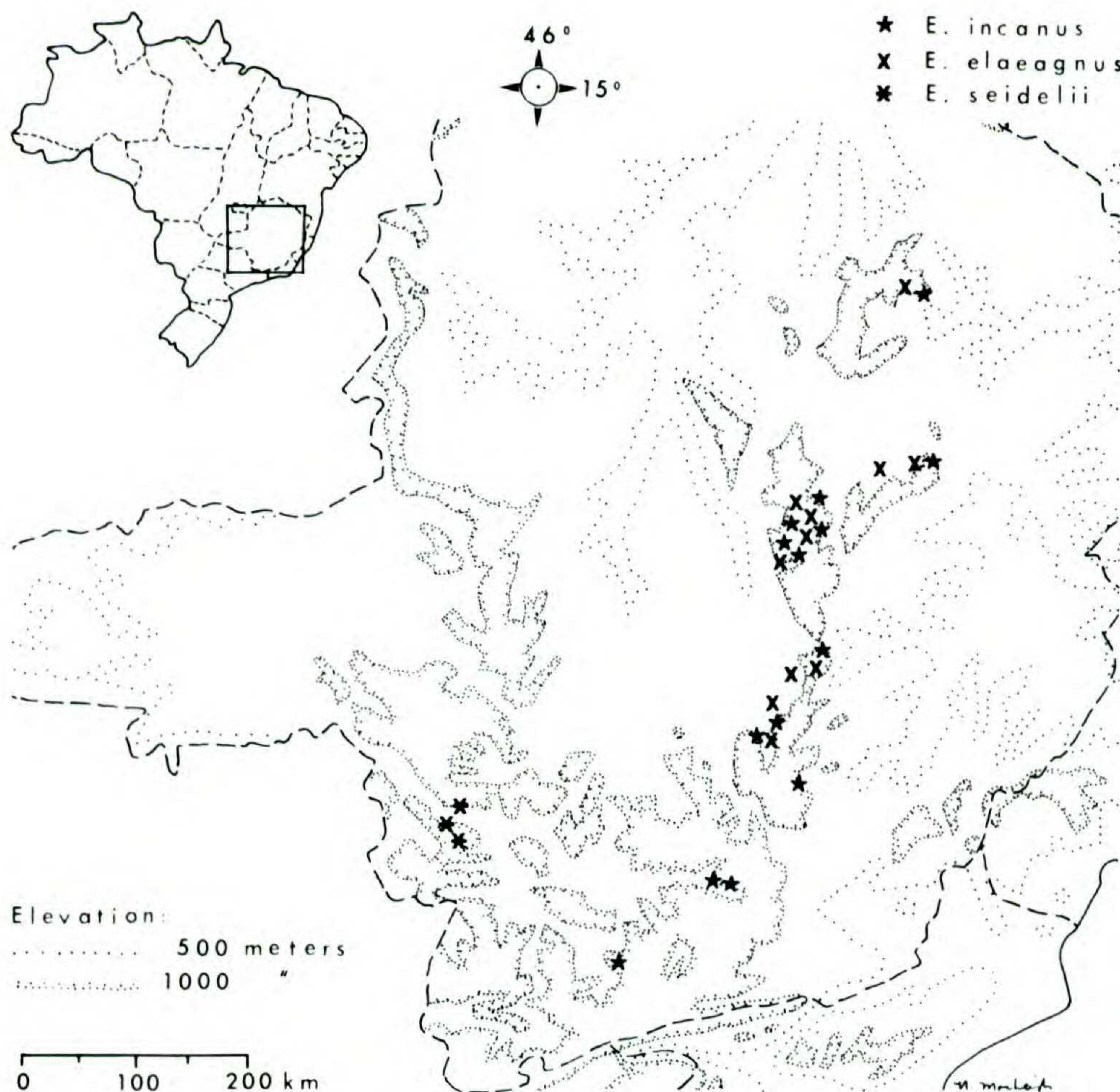


FIGURE 5. Distribution of *Eremanthus* subg. *Isotrichia* and subg. *Pseuderemanthus* in Minas Gerais.

was chosen as the lectotype. Historically, the name *Albertinia bicolor* (now *Paralychnophora bicolor*) has been confused often with *E. incanus* due to the prominent spherical glomerules in both taxa. *Paralychnophora bicolor* is characterized by solitary, relatively large, axillary glomerules, 2–4 or 8–12 florets per head, and angled, glabrous achenes with a biseriate pappus.

Additional specimens examined. BRAZIL. BAHIA: Mun. de Rio das Contas, Pico das Almas at 18 km NW de Rio das Contas, 1,600–1,850 m, 24 Jul. 1979, King *et al.* 8136 (CEPEC, MO, US). MINAS GERAIS: between Parãopeba and Diamantina, 3 Oct. 1980, MacLeish *et al.* 687 (C, G, GA, GH, NY, RB, UB, UC, US), between Mendanha and Diamantina, 4 Oct. 1980, MacLeish *et al.* 703 (BR, CEPEC, F, GA, M, MO, RB, TEX).

Possible hybrids. × *E. elaeagnus* (C. Martius ex DC.) Schultz-Bip. MINAS GERAIS: between Parãopeba and Diamantina, 3 Oct. 1980, MacLeish *et al.* 688 (F, G, GA, GH, MO, NY, RB, US). × *E. erythropappus* (DC.) MacLeish. MINAS GERAIS: Tiradente, 10 Sep. 1936, Barreto 4792 (F). × *E. polycephalus* (DC.) MacLeish. MINAS GERAIS: Itamarandiba, 6 Sep. 1981, Schumacher 1116a (GA, MB).

Eremanthus* Less. subg. *Pseuderemanthus
Schultz-Bip., Jahresber. Pollichia 20–21:

395. 1863. *Eremanthus* Less. subg. *Pseuderemanthus* Schultz-Bip. “*A. Elaeagnus*” Schultz-Bip., Jahresber. Pollichia 20–21: 395. 1863. LECTOTYPE: here designated; *Eremanthus elaeagnus* (C. Martius ex DC.) Schultz-Bip.

Leaves coriaceous. Glomerulescence a compound cyme of 10–60 hemispheric glomerules. Heads 1–20 per glomerule, cylindric, slightly appressed, free, with phyllaries in 4–6 series. Florets 3–4 per head. Achenes cylindric, 10-ribbed, sericeous. Pappus stramineous or purple, coroniform, persistent, subpaleaceous.

9. ***Eremanthus seidelii* MacLeish & Schumacher**, Syst. Bot. 9: 89. 1984. TYPE: Brazil. Minas Gerais: Furnas in Richtung Piuí, kurz von Staumauer, 800 m, 25 Aug. 1981, Schumacher 1006 (holotype, RB; isotypes, 2 in GA, K, M, MB).

Tree, to 4 m tall; stems gray lepidote-tomentulose; branches many. Leaves coriaceous, sessile to petiolate; petioles to 10 mm long, densely lepidote-tomentulose; blades 4–9 cm long, 1.2–3 cm wide, elliptic, the bases acute, the apices acu-

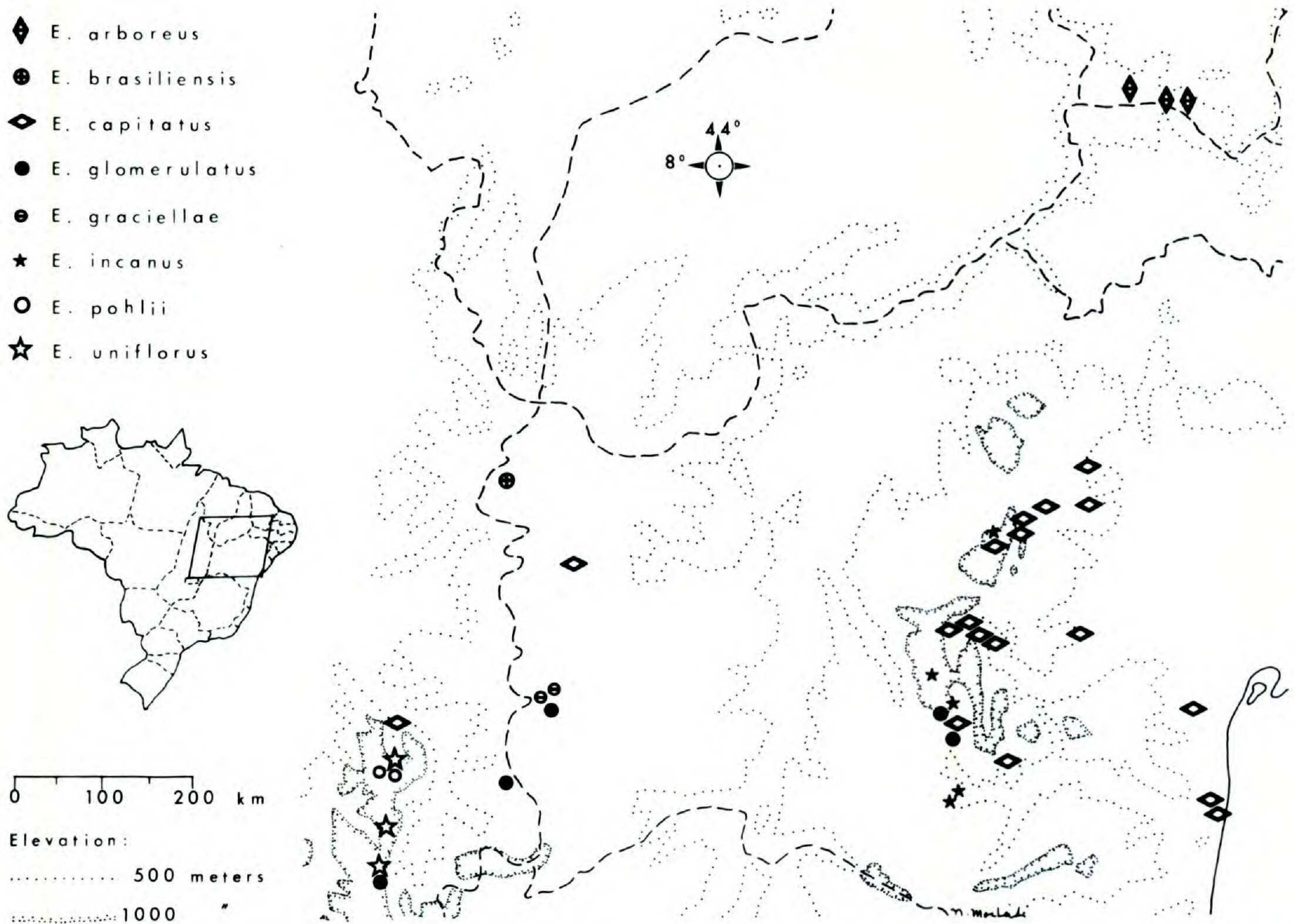


FIGURE 6. Distribution of *Eremanthus* subg. *Vanillosmopsis*, *E. glomerulatus*, and *E. incanus* in Bahia and Goiás.

minate to acute, the margins entire; adaxially sparsely lepidote, abaxially densely gray lepidote-tomentose. Peduncle slender, to 15 cm tall, terete, gray lepidote-tomentulose. Glomerulescence a compound cyme of 10–60 glomerules. Glomerules 5–10 mm tall, 6–15 mm diam., hemispherical. Heads 1–7 per glomerule, closely appressed basally, free. Involucres cylindric, 5.5–7.2 mm tall, 2.5–4 mm diam.; phyllaries in 4–6 series; outermost phyllaries trullate, 1.3–4 mm long, 1–1.5 mm wide, the apices acute; innermost phyllaries narrowly rhombic to obtrullate, 4.7–7 mm long, 0.5–1.2 mm wide, the apices acute; margins entire to subfimbriate; abaxial surfaces stramineous with purple apex, lepidote-tomentulose. Florets 3 per head; corollas purple to white, 5.4–6.5 mm tall, the lobes acuminate. Anthers 2.5–3 mm long, the apical appendage acuminate, the bases acuminate. Achenes 2.2–3.1 mm tall, glandular, sparsely sericeous between 10 ribs, apex slightly constricted; nectary 0.1–0.2 mm tall. Pappus 3–4-seriate, of stramineous, subcoroniform (at maturity) strigose bristles; outermost

series 0.8–1.2 mm long; innermost series 4.5–6.2 mm long.

Flowering and fruiting occur from June to August.

Eremanthus seidelii is restricted to the cerrado surrounding the Furnas reservoir in southwestern Minas Gerais (Fig. 5). This species is closely related to *E. elaeagnus*, which is restricted to the Serra da Espinhaço of northeastern Minas Gerais. However, *E. seidelii* is distinguished from *E. elaeagnus* by having fewer heads per glomerule (1–7 vs. 9–20), straw vs. mostly purple pappus color, elliptic vs. narrowly elliptic leaves, and flowering June–July vs. August–September.

Eremanthus seidelii and *E. elaeagnus* are transitional between subg. *Eremanthus* and subg. *Vanillosmopsis*. They approach *E. glomerulatus* in their coriaceous leaves, only 10–60 glomerules per glomerulescence, large sericeous achenes, and persistent subpaleaceous pappus. In contrast, in their lepidote tomentum, 1–20 heads per glomerule, relative lack of head fusion, 3–4 florets per

head, and occasionally purple pappus they approach many members of subg. *Vanillosmopsis*.

Additional specimens examined. BRAZIL. MINAS GERAIS: vor Alpinópolis, 12 Jun. 1977, *Seidel s.n.* (RB); bei Capitolio, 800 m, 25 Aug. 1981, *Schumacher 1009* (GA, MB); Furnas in Richtung Capitolio, 18 Oct. 1980, *Schumacher s.n.* (GA, MB).

Possible hybrids. × *E. erythropappus* (DC.) MacLeish. MINAS GERAIS: Furnas towards Piuí, 25 Aug. 1981, *Schumacher 1005* (GA); Alpinópolis, 12 Sep. 1977, *Seidel s.n.* (RB). × *E. glomerulatus* Less. MINAS GERAIS: between Furnas and Piuí, 25 Aug. 1981, *Schumacher 1008* (GA). × *E. mattogrossensis* Kuntze. MINAS GERAIS: Furnas towards Piuí, 25 Aug. 1981, *Schumacher 1003, 1004* (GA).

10. ***Eremanthus elaeagnus*** (C. Martius ex DC.) Schultz-Bip., Jahresber. Pollichia 20–21: 395. 1863. *Albertinia elaeagnus* C. Martius ex DC., Prodr. 5: 81. 1836. *Vernonia elaeagnus* (C. Martius ex DC.) Schultz-Bip., Jahresber. Pollichia 18–19: 166. 1861. TYPE: Brazil, Minas Gerais, altis lapidosis Serro Frio prope Tejuco (now Diamantina), *Martius s.n.* (holotype, M).

Small tree or shrub, 2–5 m tall; stems gray lepidote-tomentulose; branches many. Leaves coriaceous, sessile to petiolate; petioles to 10 mm long, densely lepidote-tomentulose; blades 5–12 cm long, 1.5–3 cm wide, narrowly elliptic, the bases acute to acuminate, the apices acute to rounded, the margins entire; adaxially sparsely lepidote, abaxially densely gray lepidote-tomentulose. Peduncle slender, to 14 cm tall, terete, gray lepidote-tomentulose. Glomerulescence a compound cyme of 10–60 glomerules, these 5–10 mm tall, 10–15 mm diam., hemispherical. Heads 9–20 per glomerule, closely appressed basally, free. Involucres cylindrical, 5–10 mm tall, 2.5–4 mm diam.; phyllaries in 4–5 series; outermost phyllaries trullate, 1.5–3 mm long, 0.6–1.2 mm wide, the apices acute; innermost phyllaries narrowly rhombic to obtrullate, 3.5–6.5 mm long, 0.7–1.5 mm wide, the apices acute; margins entire to subfimbriate; abaxial surfaces stramineous with purple apex, lepidote-tomentulose. Florets 3–4 per head; corollas purple to white, 5.5–7 mm tall, the lobes acuminate. Anthers 2.5–3 mm long, the apical appendage acute to acuminate, the bases acuminate. Achenes 2.5–3.5 mm tall, glandular, sparsely sericeous between 10 ribs, the apex slightly constricted; nectary 0.1–0.15 mm tall. Pappus 3–4-seriate, of purple (rarely stramineous), subcoroniform (at maturity), strigose bris-

les; outermost series 1–1.5 mm long; innermost series 6–6.5 mm long.

Flowering and fruiting occur from August to September.

Eremanthus elaeagnus is restricted to the Serra do Espinhaço in northeastern Minas Gerais at elevations of 900 to 1,370 meters (Fig. 5). It is locally common and dominant along with members of *Lychnophora* in campo rupestre. Because of the gray tomentum covering most of this plant's surface and its general resemblance to members of the *Vanillosmopsis* complex, it is locally known as "candeia branca," or white candle. This taxon is closely related to *E. seidelii* and, as noted under that species, both represent intermediates between subgenera *Eremanthus* and *Vanillosmopsis*.

Additional specimens examined. BRAZIL. MINAS GERAIS: between Parãopeba and Diamantina. 3 Oct. 1980, *MacLeish et al. 689* (F, GA, GH, MO, NY, RB); Diamantina, Barão, about 1 km along railroad, 1,170 m, 20 May 1931, *Mexia 5887* (BM, F, G, GH, MO, NY, S, TEX).

Possible hybrids. × *E. glomerulatus* Less. MINAS GERAIS: Serra do Cipó, 7 Oct. 1980, *MacLeish et al. 715* (BR, F, GA, GH, K, M, MO, NY, RB, S, US), *MacLeish et al. 716* (GA, RB), 30 Jan. 1980, *King & Almeda 8354* (US). × *E. incanus* (Less.) Less. MINAS GERAIS: between Parãopeba and Diamantina, 3 Oct. 1980, *MacLeish et al. 688* (F, G, GA, GH, MO, NY, RB, US). × *E. polycephalus* (DC.) MacLeish. MINAS GERAIS: Serra do Cipó. 7 Oct. 1980, *MacLeish et al. 718* (GA).

Eremanthus Less. subg. ***Vanillosmopsis*** (Schultz-Bip.) MacLeish, comb. nov. *Vanillosmopsis* Schultz-Bip., Jahresber. Pollichia 18–19: 166. 1861. *Vanillosmopsis* subg. *Euvanillosmopsis* Schultz-Bip., Jahresber. Pollichia 20–21: 398. 1863. TYPE: *Vanillosmopsis glomerata* Schultz-Bip. = *Eremanthus erythropappus* (DC.) MacLeish.

Leaves membranaceous to subcoriaceous. Glomerulescence a compound cyme of 100 or more hemispheric glomerules. Heads per glomerule 1–12, cylindrical or obconic, solitary or slightly to closely coherent by interwoven pubescence of phyllaries or connate by tissue confluence, phyllaries in 5–7 series. Florets per head 1–4. Achenes cylindrical (rarely cylindrical-turbinate), 10-ribbed, glabrate. Pappus purple or white (rarely stramineous), not coroniform, promptly (rarely tardily) deciduous, filiform.

Eremanthus Less. sect. **Nectaridium** (Schultz-Bip.) MacLeish, comb. nov. *Vanillosmopsis* Schultz-Bip. subg. *Nectaridium* Schultz-Bip., Jahresber. Pollichia 20–21: 400. 1863. TYPE: *Vanillosmopsis brasiliensis* (Gardner) Schultz-Bip. = *Eremanthus brasiliensis* (Gardner) MacLeish.

Heads cylindrical, solitary or in pairs slightly appressed basally. Pappus never twisted.

11. **Eremanthus pohlii** (Baker in C. Martius) MacLeish, comb. nov. *Vanillosmopsis pohlii* Baker in C. Martius, Fl. Bras. 6(2): 18. 1873. TYPE: Brazil: foz do Viera, Pohl 556 (holotype, K, not seen; isotypes, 2 in F (one a photo of B), 2 in GH (one a photo of B), NY).

Small tree, to 3 m tall; stems gray-brown lepidote; branches many. Leaves subcoriaceous, petiolate; petioles 7–10 mm long, lepidote; blades 6.4–7.6 cm long, 1.8–2.4 cm wide, lanceolate, the bases attenuate, the apices obtuse, the margins entire; adaxially glabrate, abaxially gray lepidote. Peduncle slender, to 25 cm tall, terete, gray lepidote. Glomerulescence a compound cyme of numerous (>100) glomerules. Glomerules 6–9 mm tall, 5–12 mm diam., hemispherical. Heads 1–2 per glomerule, slightly appressed, free. Involucres cylindrical, 5–7.5 mm tall, 2–3.5 mm diam. with prominent truncate base; phyllaries in 6–7 series; outermost phyllaries widely deltate, 0.5–1.2 mm long, 0.5–1.0 mm wide, the apices obtuse; innermost phyllaries lanceolate, 4–6.2 mm long, 0.6–2 mm wide, the apices acute to acuminate; margins entire to subfimbriate; abaxial surfaces stramineous with purple apex, glabrate to lepidote-tomentulose. Florets 3 per head; corollas purple, 5–6 mm tall, the lobes acuminate. Anthers 2–3 mm long, the apical appendage acuminate, the bases acute to rounded. Achenes 2.5–4 mm tall, sparsely glandular, rarely pilose, 10-ribbed, the apex slightly constricted and dark; nectary 0.2–0.5 mm tall. Pappus 3–4-seriate, of stramineous (rarely purple), tardily deciduous, strigose bristles; outermost series 1–2 mm long; innermost series 5.5–7.5 mm long.

Flowering and fruiting occur from July to September.

Eremanthus pohlii is restricted to the Chapada dos Veadeiros, which runs north to south in south central Goiás, and nearby parts of Minas Gerais

(Figs. 6, 7). It occurs in colonies on the cerrado at high elevations (ca. 1,400 m).

Eremanthus pohlii is one of the more primitive (i.e., approaching *Vernonia*) members of the subg. *Vanillosmopsis*. It is closely related to *E. graciellae* and *E. brasiliensis*, both of which are restricted to the northwestern arm of the Central Plateau. *Eremanthus pohlii* can be separated from *E. graciellae* and *E. brasiliensis* by its three florets per head and relatively long leaves (6.5–7.5 vs. 2.5–6.5 cm long). The only other member of the *Vanillosmopsis* complex that occurs sympatrically with these taxa is *E. uniflorus*. *Eremanthus uniflorus* is most closely related to *E. capitatus* and is distinguished (among other less discriminating characters) by a single floret per head and 3–9 heads per glomerule.

Additional specimens examined. BRAZIL. GOIÁS: Brasília towards Campos Belos, 15 km from Alto Paraíso, 1,400 m, 28 Aug. 1981, Schumacher 1032, 1033 (GA, MB), Schumacher 1034 (MB, NY). MINAS GERAIS: João Pinheiro, 15 Aug. 1967, Heringer 11531 (NY, RB).

12. **Eremanthus graciellae** MacLeish & Schumacher, Syst. Bot. 9: 87. 1984. TYPE: Brazil. Bahia: BR 020 Brasília Richtung Barreiras, 15 km weiter in Richtung Barreiras von Fazenda Prainha, km 374, 800 m, 28 Aug. 1981, Schumacher 1048 (holotype, RB; isotypes, GA, K, M, MB).

Small tree, to 2.5 m tall; stems gray-brown lepidote; branches many. Leaves subcoriaceous, petiolate; petioles 8–15 mm long, lepidote; blades 4.5–6.5 cm long, 1.5–3 cm wide, elliptic to narrowly elliptic, the bases acute, the apices acute to obtuse, the margins entire; adaxially glabrate, abaxially gray lepidote. Peduncle slender, to 25 cm tall, terete, gray lepidote. Glomerulescence a compound cyme of numerous (more than a hundred) glomerules. Glomerules 6–9 mm tall, 4–9 mm diam., obconic. Heads 1–2 per glomerule, slightly appressed, free. Involucres cylindrical, 5.2–7.5 mm tall, 2.1–2.8 mm diam., with prominent truncate base; phyllaries in 6–7 series; outermost phyllaries widely deltate, 0.6–1.2 mm long, 0.7–1.2 mm wide, the apices acute; innermost phyllaries lanceolate, 3.8–6.1 mm long, 0.6–1.4 mm wide, the apices acute to acuminate; margins entire to subfimbriate; abaxial surfaces stramineous with purple apex, glabrate to lepidote-tomentulose. Florets 2 per head; corollas purple to white, 4.2–7 mm tall, the lobes acu-

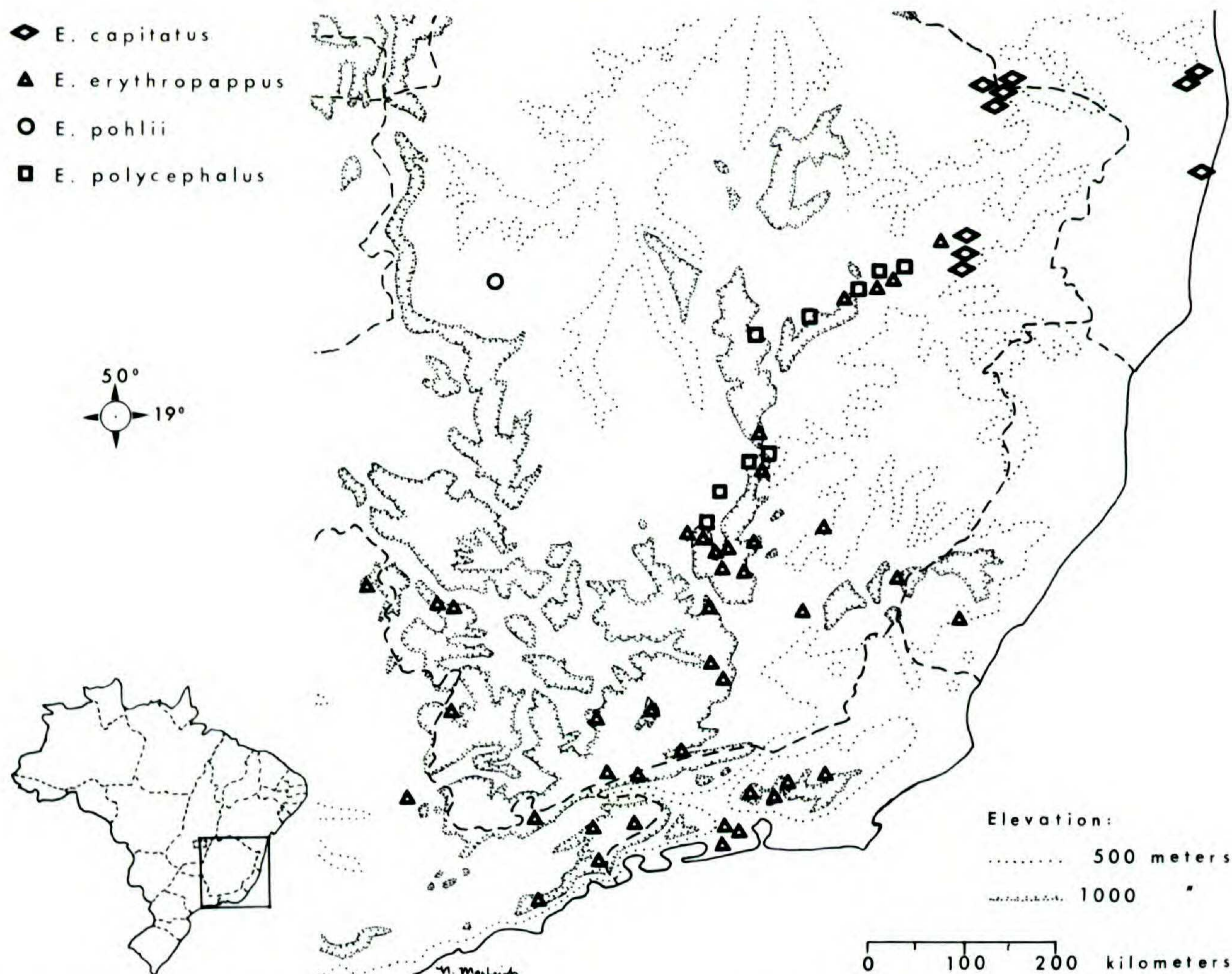


FIGURE 7. Distribution of *Eremanthus* subg. *Vanillosmopsis* in Minas Gerais.

minate. Anthers 2.1–2.8 mm long, the apical appendage acuminate, the bases acuminate. Achenes 2.2–3.5 mm tall, sparsely glandular, 10-ribbed, the apex slightly constricted and dark; nectary 0.2–0.5 mm tall. Pappus 3–5-seriate, of stramineous to white, deciduous, strigose bristles; outermost series 1–2 mm long; innermost series 5–7.2 mm long.

Flowering and fruiting occur from July to August.

Eremanthus graciellae is distributed along the Serra Geral de Goiás, which runs north to south along the border of Goiás and Bahia (Fig. 6). It occurs in colonies on the quartzite grasslands characteristic of this plateau.

Eremanthus graciellae is also one of the primitive (approaching *Vernonia*) members of *Eremanthus*. It can be separated from close relatives, *E. graciellae* and *E. brasiliensis*, by its two florets per head and intermediate length leaves.

Additional specimens examined. BRAZIL. BAHIA: BR 020 Brasília Richtung Barreiras, 15 km weiter in Richtung Barreiras von Fazenda Prainha, 800 m, 28 Aug.

1981, Schumacher 1046 (GH, MB), Schumacher 1047 (GA, MB).

13. ***Eremanthus brasiliensis*** (Gardner) MacLeish, comb. nov. *Monosis brasiliensis* Gardner, London J. Bot. 5: 230. 1846. *Vernonia brasiliensis* (Gardner) Schultz-Bip., Jahresber. Pollichia 18–19: 161. 1861, nom. illeg. (nom. rej. pro *Vernonia brasiliensis* (Sprengel) Less., Linnaea 6: 681–682. 1831. = *Albertinia brasiliensis*). *Vanillosmopsis brasiliensis* (Gardner) Schultz-Bip., Jahresber. Pollichia 20–21: 400. 1863. TYPE: Brazil, “Pernambuco” (now Bahia): woods in the district of the Rio Preto, Sep. 1834, Gardner 2897 (holotype, BM; isotypes, 5 in F (fragments from G and P, photos of G and W), G, GH).

Small tree, to 4 m tall; stems gray-brown lepidote; branches many. Leaves subcoriaceous, petiolate; petioles 5–10 mm long, lepidote; blades 2.4–4.2 cm long, 0.8–2.6 cm wide, elliptic to narrowly elliptic, the bases acute to attenuate, the apices obtuse, the margins entire; adaxially

glabrate and glandular, abaxially gray lepidote. Peduncle slender, terete, gray lepidote. Glomerulescence a compound cyme of 100 or more glomerules. Glomerules 6–8 mm tall, 4–8 mm diam., obconic. Heads 1–2 per glomerule, slightly appressed, free. Involucres cylindrical, 5–6.5 mm tall, 2–2.5 mm diam.; phyllaries in 6–7 series; outermost phyllaries widely deltate, 0.6–1 mm long, 0.5–1 mm wide, the apices acute; innermost phyllaries lanceolate, 3.5–6 mm long, 0.5–1 mm wide, the apices acute to acuminate; margins entire to subfimbriate; abaxial surfaces stramineous, glabrate to lepidote-tomentulose. Florets 1 per head; corollas not seen. Achenes 2–3.5 mm tall, sparsely glandular, obscurely-ribbed, the apex slightly constricted and dark; nectary 0.3–0.4 mm tall. Pappus 3–4-seriate, of stramineous, tardily deciduous, strigose bristles; outermost series 1–2 mm long; innermost series 5–7 mm long.

Flowering and fruiting probably occur from August to September.

Eremanthus brasiliensis is distributed in the northern part of the Serra Geral de Goiás (Fig. 6), which runs north to south along the border of Goiás and Bahia. This species is known only from the type specimens. Schumacher (1982) unsuccessfully attempted to locate it at the same time that he rediscovered *E. arboreus* in southern Ceará.

Like *E. graciellae* and *E. pohlii*, *E. brasiliensis* is one of the more primitive members of the *Vanillosmopsis* complex. It is distinguished by one floret per head, small leaves (2.5–4.5 vs. 4.5–7.5 cm long), and heads which lack the prominent truncate bases of its closest relatives.

Eremanthus Less. sect. *Vanillosmopsis* (Schultz-Bip.) MacLeish, comb. nov. *Vanillosmopsis* subg. *Euvanillosmopsis* Schultz-Bip., Jahresber. Pollichia 20–21: 398. 1863. LECTOTYPE: *Eremanthus erythropappus* (DC.) MacLeish.

Heads cylindrical or obconic. Heads per glomerule (2–)5–12. Pappus often twisted.

14. **Eremanthus polycephalus** (DC.) MacLeish, comb. nov. *Albertinia polycephala* DC., Prodr. 5: 82. 1836. *Vanillosmopsis polycephala* (DC.) Schultz-Bip., Jahresber. Pollichia 18–19: 168. 1861. TYPE: Brazil. Minas Gerais: planitie alta ad Piedade Villam, *Martius s.n.* (holotype, M; isotype, M).

Albertinia saligna C. Martius ex DG., Prodr. 5: 82. 1836. *Vanillosmopsis saligna* (DC.) Schultz-Bip., Jahresber. Pollichia 18–19: 168. 1861. TYPE: Brazil. Minas Gerais: in editis siccis rupestribus montium Serro Frio, *Martius s.n.* (holotype, M).

Shrub or small tree, to 3.5 m tall; stems gray-brown lepidote; branches many. Leaves membranaceous to subcoriaceous, sessile to petiolate; petioles to 8 mm long, lepidote; blades 4.5–7 cm long, 1–1.8 cm wide, lanceolate, the bases acuminate to attenuate, the apices acute to obtuse, the margins entire; adaxially glabrate, abaxially gray lepidote. Peduncle slender, to 23 cm tall, terete, gray lepidote. Glomerulescence a compound cyme of 100 or more glomerules, these 5–7 mm tall, 4–8 mm diam., hemispherical. Heads 6–12 per glomerule, closely appressed, connate $\frac{1}{2}$ length by concrescence of phyllary tissues. Involucres cylindrical, 4–5.5 mm tall, 0.5–2 mm diam.; phyllaries in 6–7 series; outermost phyllaries widely deltate, 0.6–1.2 mm long, 0.7–1.2 mm wide, the apices obtuse; innermost phyllaries lanceolate, 3–5 mm long, 0.5–1.2 mm wide, the apices acute to acuminate, the margins entire to subfimbriate; abaxial surfaces stramineous with purple apex, lepidote-tomentulose. Florets 1 per head; corollas purple, 4–6.5 mm tall, the lobes acuminate to acute. Anthers 2–2.5 mm long, the apical appendage acuminate, the bases acute. Achenes 1.5–2.8 mm tall, glandular, 10-ribbed, the apex slightly constricted and dark; nectary 0.2–0.4 mm tall. Pappus 3–4-seriate, of stramineous, white or purple, tardily deciduous, strigose bristles; outermost series 0.2–1 mm long, the innermost series 3–5.5 mm long.

Flowering and fruiting occur from June to November.

Eremanthus polycephalus is distributed along the Serra do Espinhaço, which runs north to south through the center of Minas Gerais (Fig. 7). It occurs in colonies on the campo rupestre habitats characteristic of high elevations (700–1,370 meters). The common name of “candeia,” or candle, is applied locally.

Eremanthus polycephalus is most closely related to *E. erythropappus* and is sympatric with it in the northernmost portion of its range. Uniquely, in subg. *Vanillosmopsis*, both of these taxa exhibit concrescence of phyllary and receptacle tissues. However, *E. polycephalus* is easily distinguished by its single floret per head (vs. 3–4) and partial fusion of heads (vs. nearly total fusion). This species, because of its single floret

per head and various characteristics associated with the *Vanillosmopsis* complex, superficially resembles *E. uniflorus* and *E. brasiliensis*, taxa that are restricted to Goiás and nearby Bahia and which are distinguished by their lack of tissue fusion within glomerules.

Additional specimens examined. BRAZIL. MINAS GERAIS: 14 km NE of Diamantina towards Mendanha on Estrada 367, 1,370 m, 4 Oct. 1980, *MacLeish et al.* 702 (GA, GH, K, LE, NY, RB, UB, US).

Possible hybrids. × *E. elaeagnus* (C. Martius ex DC.) Schultz-Bip. MINAS GERAIS: Serra do Cipó, 7 Oct. 1980, *MacLeish et al.* 718 (GA). × *E. incanus* (Less.) Less. MINAS GERAIS: Itamarandiba, 6 Sep. 1981, *Schumacher 1116a* (GA).

15. ***Eremanthus erythropappus*** (DC.) MacLeish, comb. nov. *Albertinia erythropappa* DC., Prodr. 5: 82. 1836. *Vanillosmopsis erythropappa* (DC.) Schultz-Bip., Jahresber. Pollichia 18–19: 167. 1861. TYPE: Brazil. Minas Gerais: Marianne, *Vauthier 334* (holotype, G-DC (as IDC microfiche); isotypes, G, 2 in GH).

Albertinia candolleana Gardner, London J. Bot. 5: 235. 1846. TYPE: Brazil. Minas Gerais: near Villa do Principe, Aug. 1840, *Gardner 4812* (holotype, BM; isotypes, F, 2 in G, 2 in GH, 3 in NY, S).

Vanillosmopsis glomerata Schultz-Bip., Jahresber. Pollichia 18–19: 167. 1861. *Vernonia glomerata* Schultz-Bip., Bot. Zeitung. (Berlin) 3: 155. 1845. nom. nud. LECTOTYPE: here designated from among syntypes; Brazil. Minas Gerais: Aug.–Apr. 1840, *Claussen 2063* (G; isolectotypes, G, 2 in GH, M, MO). Syntypes: Brazil. (Rio de Janeiro): in colibus siccis calidisque inter Mandioca et Serra Estrella, *Riedel s.n.* (577) (not found); no other data, *Claussen 863* (853) (not found); no other data, *Schucht 75* (W, not found).

Shrub or tree, to 10 m tall, to 10 cm diam.; stems gray-brown lepidote; branches many. Leaves membranaceous, petiolate; petioles 3–15 mm long, lepidote; blades 5–10.2 cm long, 1.6–3.6 cm wide, oblanceolate to elliptic, the bases acute to acuminate, the apices acute to attenuate, the margins entire; adaxially glabrate to lepidote, abaxially gray lepidote. Peduncle slender, to 23 cm tall, terete, gray lepidote. Glomerulescence a compound cyme of 100 or more glomerules. Glomerules 6–15 mm tall, 4–12 mm diam., hemispherical. Heads 6–12 per glomerule, closely appressed, connate nearly entire length by concrescence of phyllary tissues and pubescence. Involucres obconic, 5–7.2 mm tall, 2.1–4.2 mm diam.; phyllaries in 5–6 series; outermost phyllaries widely deltate, 0.6–1.5 mm long, 0.7–1.3

mm wide, the apices acute; innermost phyllaries lanceolate, 3.6–6.8 mm long, 0.5–1.2 mm wide, the apices acute to acuminate; margins entire to subfimbriate; abaxial surfaces stramineous with purple apex, lepidote-tomentulose (rarely glabrate). Florets 3(–4) per head; corollas purple to white with age, 4–6.5 mm tall, the lobes acuminate. Anthers 2.1–2.7 mm long, the apical appendage acuminate, the bases acute. Achenes cylindrical-turbinate, 1.2–2.5 mm tall, glandular, 10-ribbed, the apex slightly constricted and dark; nectary 0.15–0.25 mm tall. Pappus 3–4-seriate, of stramineous, white or purple, often curling, promptly deciduous, strigose bristles; outermost series 1.2–3 mm long; innermost series 3–6.5 mm long.

Flowering and fruiting occur from June to November.

Eremanthus erythropappus is distributed throughout southeastern portions of the Central Plateau (Fig. 7) at 700 to 2,400 meters. It is extremely common in colonies amidst secondary forest of the coastal range and cerrado of the interior plateau. It is often used as a living fence around fields because the high terpenoid content of its leaves deters insects. Also, it is commonly known as “candeia,” candle, or “pau de candeia,” candlestick.

Because of its extensive range, *E. erythropappus* is one of the most commonly collected members of *Eremanthus*. Along with *E. polycephalus* and *E. incanus*, it exhibits a distinctive concrescence of phyllary and receptacle tissues. *Eremanthus erythropappus* is further distinguished by its 3–4 florets per head (vs. 1), 6–12 heads per glomerule (vs. 30–100 in *E. incanus*), and nearly total connation of heads (vs. partial connation in *E. polycephalus*). The epithets assigned by Gardner (1846) and Schultz-Bip. (1861) to this species are indicative of the variation ascribable to age and habitat differences.

Additional specimens examined. BRAZIL. ESPÍRITO SANTO: Mun. de Cachoeus do Itapemirim, Vargem Alta Morro do Sal, 700 m, 3 Aug. 1980, *Ferreira & Borges 1882* (GA), 21 Aug. 1948, *Brade 19340* (RB). MINAS GERAIS: Serra do Curral, Nova Lima, 1,300 m, 6 Aug. 1945, *Williams & Assis 8029* (BM, BR, C, F, G, GH, MO, NY, RB, S, TEX). RIO DE JANEIRO: Teresopolis, Serra das Orgãos, 24 Sep. 1980, *MacLeish et al.* 670 (C, GA, GH, LE, MO, NY, RB, TEX, UB, W). SÃO PAULO: Serra da Bocaina, 25 km from São José do Barreiro towards Park of Bocaina, 1,640 m, 30 Sep. 1980, *MacLeish et al.* 679 (B, BM, CEPEC, GA, RB, S, TEX, W).

Possible hybrids. × *E. capitatus* (Sprengel) MacLeish. MINAS GERAIS: Carai, 6 Sep. 1981, *Schumacher 1083, 1085, 1089* (GA). × *E. incanus* (Less.) Less. MINAS GERAIS: Tiradente, 10 Sep. 1936, *Barreto 4792* (F). × *E. seidelii* MacLeish & Schumacher. MINAS GERAIS: Furnas towards Piuí, 25 Aug. 1981, *Schumacher 1005* (GA), Alpinópolis, 12 Sep. 1977, *Seidel s.n.* (RB).

16. ***Eremanthus uniflorus*** MacLeish & Schumacher, *Syst. Bot.* 9: 93. 1984. TYPE: Brazil. Goiás: 33 km N of Alto Paráiso towards Cavalcante, 1,370 m, 14 Oct. 1980, *MacLeish, Martinelli, Smith & Stutts 736* (holotype, RB; isotypes, F, G, GA, K, M, NY, P, S, UB, US).

Shrubby tree, to 2.5 m tall; stems gray-brown lepidote; branches many. Leaves membranaceous to subcoriaceous, petiolate; petioles 5–20 mm long, lepidote; blades 3.8–8 cm long, 1.2–4 cm wide, elliptic, the bases acute, the apices acute, the margins entire; adaxially glabrate, abaxially gray lepidote. Peduncle slender, to 25 cm tall, terete, gray lepidote. Glomerulescence a compound cyme of 100 or more glomerules, these 3–7 mm tall, 3–10 mm diam., hemispherical. Heads 3–9 per glomerule, slightly appressed and adherent basally by pubescence of phyllaries. Involucres cylindrical, 4–7 mm tall, 1–2 mm diam.; phyllaries in 5–7 series; outermost phyllaries trullate, 0.7–2 mm long, 0.4–1 mm wide, the apices acute; innermost phyllaries lanceolate, 3.5–5.5 mm long, 0.5–0.9 mm wide, the apices acuminate; margins entire to subfimbriate; abaxial surfaces stramineous with purple apex and midvein, glabrate to lepidote-tomentulose. Florets 1 per head; corollas purple (to white with age), 5–7 mm tall, the lobes acuminate. Anthers 2.7–3.8 mm long, the apical appendage acuminate, the bases acuminate. Achenes 2.4–3.2 mm tall, glandular, 10-ribbed, the apex slightly constricted and dark, occasionally pilose at base; nectary 0.05–0.1 mm tall. Pappus 3–5-seriate, of purple to stramineous, deciduous, strigose bristles; outermost series 0.8–1.8 mm long; innermost series 5.5–7 mm long.

Flowering and fruiting occur from August to October.

Eremanthus uniflorus is restricted to the Chapada dos Veadeiros in central Goiás (Fig. 6). Although locally abundant, it is found only on campo rupestre outcrops.

A single floret per head, the relatively weak coherence of heads, and 3–9 heads per glomerule

distinguish *E. uniflorus* from other members of sect. *Vanillosmopsis*. This taxon is closely related to *E. capitatus*, which is primarily restricted to the northeast arm of the Central Plateau and differs in that *E. capitatus* has 3–4 florets per head and 2–5 heads per glomerule.

Additional specimens examined. BRAZIL. GOIÁS: Brasília Richtung Alto Paráiso de Goiás, 50 km nach São João de Aliança, 1,000 m, 27 Aug. 1981, *Schumacher 1030* (GA, K, M, MB, RB, W); Chapados Veadeiros, 33 km N of Alto Paráiso, 1,220 m, 24 Jan. 1980, *King & Almeda 8291* (US).

Possible hybrids. × *E. argenteus* MacLeish & Schumacher. GOIÁS: Alto Paráiso, 28 Aug. 1981, *Schumacher 1038, 1039, 1041* (GA).

17. ***Eremanthus capitatus*** (Sprengel) MacLeish, comb. nov. *Conyza capitata* Sprengel, *Syst. Veg.* 3: 507. 1826. *Vernonia capitata* (Sprengel) Less., *Linnaea* 4: 270. 1829. *Albertinia capitata* (Sprengel) DC., *Prodr.* 5: 82. 1836. *Vanillosmopsis capitata* (Sprengel) Schultz-Bip., *Jahresber. Pollichia* 18–19: 167. 1861. LECTOTYPE: here designated; Brazil. Bahia: inter Victoria et Bahia (now Salvador), *Sellow s.n.* (K; isolectotype, GH).

Polypappus discolor DC., *Prodr.* 7: 281. 1838. *Vanillosmopsis discolor* (DC.) Baker in C. Martius, *Fl. Bras.* 6(2): 17. 1873. TYPE: Brazil. Bahia: Jacobina, Jan. 1843, *Blanchet 2591* (holotype, G; isotypes, BM, 4 in BR, C, 3 in F (one photo of C), 2 in G, GH, MO, 2 in NY, P).

Vanillosmopsis albertinioides Schultz-Bip., *Jahresber. Pollichia* 18–19: 168. 1861. TYPE: Brazil: no other data, *Sellow s.n.* (holotype, B, not found).

Shrub or tree, to 6 m tall, to 8 cm diam.; stems gray-brown lepidote; branches many. Leaves membranaceous to subcoriaceous, sessile to petiolate; petioles 1–12 mm long, lepidote; blades 4.6–10.5 cm long, 2.4–4.2 cm wide, elliptic to obovate, the bases acute, the apices acute to acuminate, the margins entire; adaxially glabrate to lepidote, abaxially gray lepidote. Peduncle slender, to 30 cm tall, terete, gray lepidote. Glomerulescence a compound cyme of 100 or more glomerules. Glomerules 4–10 mm tall, 3–12 mm diam., hemispherical. Heads 2–5 per glomerule, slightly appressed and coherent basally by pubescence of phyllaries. Involucres cylindrical to obconic with age, 5–8 mm tall, 2–4 mm diam.; phyllaries in 5–6 series; outermost phyllaries widely deltate, 0.5–1.1 mm long, 0.7–1.2 mm wide, the apices acute; innermost phyllaries lanceolate, 3.4–7.6 mm long, 0.6–1.4 mm wide, the apices acuminate; margins entire to subfim-

briate; abaxial surfaces stramineous to green, glabrate to lepidote-tomentulose. Florets 3(-4) per head; corollas purple with white tube and becoming white with age, 4.2-7.2 mm tall, the lobes acuminate. Anthers 2.2-2.8 mm long, the apical appendage acuminate, the bases acute. Achenes 2-2.5 mm tall, glandular, 10-ribbed, the apex slightly constricted and dark; nectary 0.3-0.4 mm tall. Pappus 3-4-seriate, of purple, white or stramineous, often curling, promptly deciduous, strigose bristles; outermost series 2.5-3.5 mm long; innermost series 4-6.5 mm long.

Flowering and fruiting occur from July to November.

Eremanthus capitatus is distributed throughout the northeastern arm of the Central Plateau (Figs. 6, 7) at elevations of 100 to 1,000 meters. It occurs in large colonies in cerrado or on the border of secondary forest and is known as "candeia," or candle, in Bahia.

Eremanthus capitatus is closely related to *E. uniflorus*, *E. arboreus*, and *E. erythropappus*. It is distinguished by its 3-4 florets per head and 2-5 heads per glomerule. *Eremanthus uniflorus* is likely derived from an isolated population of *E. capitatus* in the northwestern arm of the Central Plateau whose number of florets per head has decreased from three to one. In contrast, *E. arboreus* represents a population found in the extreme northeastern part of the plateau whose number of heads per glomerule has increased from 2-5 to 6-9. *Eremanthus capitatus* and *E. erythropappus* have the same number of florets per head, but *E. capitatus* lacks the fusion of receptacle and phyllary tissues observed in *E. erythropappus*.

Flowering or immature specimens of this taxon are frequently misidentified as *E. pohlii*. When young, each head is noticeably cylindrical like those of *E. pohlii*; however, as fruits mature, the innermost phyllaries drop off and the outermost spread out so that heads appear to be cylindrical-turbinate.

Sprengel's types are generally considered to have been deposited at B, BM, BR, or P. Unfortunately, a holotype was not located in any of these herbaria. However, a specimen was located at K bearing the citation "ex herb. B" and the correct citation in Sprengel's handwriting. Therefore, the Kew specimen has been chosen as lectotype.

Additional specimens examined. BRAZIL, BAHIA: 33 km from BR 101 on road S to Canavieiras, 23 Oct.

1980, *MacLeish & Soares Nunes 758* (BR, C, CEPEC, F, GA, GH, MO, NY, RB, UC, US). GOIÁS: 5-10 km N of Veadeiros, Valley of the Rio Paraná, 19 Jul. 1964, *Prance & Silva 58251* (F, NY, RB, S, UB). MINAS GERAIS: BR 116 Téofo Otôni towards Bahia, 2 km from Padre Paráiso, 8 Sep. 1981, 600 m, *Schumacher 1082* (GA, MB).

Possible hybrids. × *E. erythropappus* (DC.) MacLeish. MINAS GERAIS: Carai, 6 Sep. 1981, *Schumacher 1083, 1085, 1089* (GA).

18. ***Eremanthus arboreus*** (Gardner) MacLeish, comb. nov. *Albertinia arborea* Gardner, London J. Bot. 5: 236. 1846. *Vanillosmopsis arborea* (Gardner) Baker in C. Martius, Fl. Bras. 6(2): 16. 1873. TYPE: Brazil. Ceará: Serra de Araripe, Nov. 1838, *Gardner 1713* (holotype, BM; isotypes, BR, 4 in F (including fragment from P and photo of B), 2 in G, 3 in GH (one is photo of B), 2 in NY).

Tree, to 6 m tall; stems gray-brown lepidote; branches many. Leaves membranaceous to subcoriaceous, petiolate; petioles 5-10 mm long, lepidote; blades 5-6.5 cm long, 1.6-2 cm wide, narrowly elliptic to obovate, the bases attenuate, the apices acute to acuminate, the margins entire; adaxially glabrate to lepidote, abaxially gray lepidote. Peduncle slender, to 30 cm tall, terete, gray lepidote. Glomerulescence a compound cyme of 100 or more glomerules. Glomerules 5-12 mm tall, 8-15 mm diam., hemispherical. Heads 6-9 per glomerule, slightly appressed and coherent basally by pubescence of phyllaries. Involucres obconic, 5-7.5 mm tall, 2-3.5 mm diam.; phyllaries in 5-6 series; outermost phyllaries widely deltate, 0.6-1 mm long, 0.5-1.2 mm wide, the apices acute; innermost phyllaries lanceolate, 4-6 mm long, 0.5-1.2 mm wide, the apices acute to acuminate; margins entire to subfimbriate; abaxial surfaces stramineous to green, glabrate to lepidote-tomentulose. Florets 3(-4) per head; corollas white or purple, 4-7 mm tall, the lobes acuminate. Anthers 2-3 mm long, the apical appendage acute, the bases acute. Achenes 1.5-2.5 mm tall, sparsely glandular, 10-ribbed, the apex slightly constricted and dark; nectary 0.25-0.35 mm tall. Pappus 3-5-seriate, of stramineous to off-white (occasionally purple basally), often curling, promptly deciduous, strigose bristles; outermost series 2.5-3 mm long; innermost series 4-6 mm long.

Flowering and fruiting occur from August to September.

Eremanthus arboreus is restricted to the north-eastern slope of the Chapada do Araripe (Fig. 6), near Crato, which runs along the border of Ceará and Pernambuco at elevations of 700 meters. It occurs in colonies on wooded slopes near the top of the plateau which are less dry than the surrounding caatinga.

Eremanthus arboreus is closely related to *E. capitatus* and is distinguished by its 6–9 heads per glomerule. This species probably represents an extreme northeastern population of *E. capitatus* whose number of heads per glomerule has increased from 2–5 to 6–9. Until recently, this species was known only from the type collection. However, Schumacher (1982) was able to collect it again from what was probably Gardner's original site during several expeditions designed to rediscover members of *Eremanthus* that were known only from type specimens.

Additional specimens examined. BRAZIL. CEARÁ: Chapada do Araripe, hillside on street out of Crato, 25 Aug. 1980, Schumacher s.n. (GA, MB, RB), Crato towards Nova Olinda, at slope near top of plateau, 700 m, 31 Aug. 1981, Schumacher 1049 (B, GA, K, MB, RB).

EXCLUDED TAXA

- Eremanthus* Less. sect. *Chresta* (Vell. Conc. ex DC.) Baker in C. Martius, Fl. Bras. 6(2): 166. 1873. *Chresta* Vell. Conc. ex DC., Prodr. 5: 85. 1836. TYPE: (Robinson, 1980): *Chresta sphaerocephala* DC. = *Chresta* Vell. Conc. ex DC.
- Eremanthus* Less. sect. *Pycnocephalum* (Less.) Baker in C. Martius, Fl. Bras. 6(2): 168. 1873. *Vernonia* Schreber sect. *Pycnocephalum* Less., Linnaea 6: 629. 1831. TYPE: (MacLeish, 1985a): *Pycnocephalum plantaginifolium* (Less.) DC. = *Pycnocephalum* (Less.) DC.
- Eremanthus* Less. sect. *Sphaerophora* (Schultz-Bip.) Baker in C. Martius, Fl. Bras. 6(2): 165. 1873. *Sphaerophora* Schultz-Bip., Jahresber. Pollichia 20–21: 402. 1863, nom. illeg. (non *Sphaerophora* Blume, 1850, Rubiaceae). *Paralychnophora* MacLeish, Taxon 33: 106. 1984. TYPE: *Paralychnophora bicolor* (DC.) MacLeish = *Paralychnophora* MacLeish.
- Eremanthus* Less. sect. *Stachyanthus* (DC.) Baker in C. Martius, Fl. Bras. 6(2): 167. 1873. *Stachyanthus* DC., Prodr. 5: 84. 1836, nom. rej. (vs. *Stachyanthus* Engler, 1897, Icacinaceae). *Argyrovernonia* MacLeish, Taxon 33: 106–107. 1984. TYPE: *Argyrovernonia martii* (DC.) MacLeish = *Argyrovernonia* MacLeish.
- Eremanthus* Less. subg. *Pseuderemanthus* Schultz-Bip. "B. Jodopappus" Schultz-Bip., Jahresber. Pollichia 20–21: 396. 1863. TYPE: *Vernonia crotonoides* (DC.) Schultz-Bip. = *Vernonia* Schreber subg. *Vernonia* sect. *Vernonia*.
- Eremanthus angustifolius* (Gardner) Baker in C. Martius, Fl. Bras. 6(2): 170. 1873. *Chresta angustifolia* Gardner, London J. Bot. 1: 240, tab. 8. 1842. TYPE: Brazil. Goiás: shady places at Arrayas, Gardner 3802 (holotype, BM); isotypes, 3 in F (includes fragment from P and photo of B), 2 in G, GH (photo of B), NY, S, W) = *Pycnocephalum angustifolium* (Gardner) MacLeish (1985a).
- Eremanthus bicolor* (DC.) Baker in C. Martius, Fl. Bras. 6(2): 165. 1873. *Albertinia bicolor* DC., Prodr. 5: 81. 1836. TYPE: Brazil. Minas Gerais: altis, Martius s.n. (holotype, M; isotype, M) = *Paralychnophora bicolor* (DC.) MacLeish (1984a).
- Eremanthus crotonoides* (DC.) Schultz-Bip., Jahresber. Pollichia 20–21: 396. 1863. *Albertinia crotonoides* DC., Prodr. 5: 81. 1836. TYPE: Brazil. Minas Gerais: montium sepibus, Martius s.n. (holotype, M) = *Vernonia crotonoides* (DC.) Schultz-Bip.
- Eremanthus curumbensus* Philipson, Kew Bull. 1938: 298. 1938. TYPE: Brazil. Goiás: valley of the Rio Curumbo in the plains between the mountains, Glaziou 21645 (holotype, K; isotypes, BR, C, 4 in G, NY) = *Glaziovianthus curumbensis* (Philipson) MacLeish (1985b).
- Eremanthus descampsii* Klatt ex De Wild. & T. Durand, Ann. Mus. Congo, Ser. 1, Bot. 1: 99. 1898, non *Vernonia descampsii* De Wild., Bull. Jard. Bot. État. 5: 97. 1915. TYPE: Rep. of the Congo, Katanga, Vallee de la Liula, 1891, Descamps s.n. (holotype, BR not seen; fragment and drawing of BR, GH) = *Vernonia klattii* MacLeish (1984b).
- Eremanthus eriopus* (Schultz-Bip.) Baker in C. Martius, Fl. Bras. 6(2): 169. 1873. *Prestelia eriopus* Schultz-Bip., Naturf. Ges. Emden 1864: 73. 1864. TYPE: Brazil. Minas Gerais: in glareosis S. da Lapa, Riedel 1127 (holotype, LE; isotypes, 2 in F (fragment and photo of P), P, TEX (photo of P)) = *Prestelia eriopus* Schultz-Bip.
- Eremanthus exsuccus* (DC.) Baker in C.

- Martius, Fl. Bras. 6(2): 166. 1873. *Chresta exsucca* DC., Prodr. 5: 85. 1836. TYPE: Brazil. Minas Gerais: montosis Minarum, *Martius s.n.* (holotype, M; photos of M, F, TEX) = *Chresta exsucca* DC.
13. *Eremanthus harmsianus* Taub., Bot. Jahrb. Syst. 21: 453. 1896. TYPE: Brazil. Goiás: Serra dos Pyreneos, *Ule 2984* (holotype, HBG, not seen; isotype, P) = *Glaziovianthus speciosus* (Gardner) MacLeish (1985b).
 14. *Eremanthus imbricatus* G. Barroso, Rodriguesia 23–24: 6. 1962. TYPE: Brazil. Distrito Federal: Brasilândia, *Macedo 4* (holotype, RB; isotype RB) = *Chresta exsucca* DC.
 15. *Eremanthus jelskii* Hieron., Bot. Jahrb. Syst. 36: 462. 1905, non *Vernonia jelskii* Hieron., Bot. Jahrb. Syst. 36: 459. 1905. TYPE: Peru, crescit prope Shanyn, *Jelskii 776* (lectotype, US (MacLeish, 1984b); isolectotypes, photos of B, F, GH, NY, TEX) = *Vernonia shanynensis* MacLeish (1984b).
 16. *Eremanthus labordeii* Glaz., Mem. Soc. Bot. France 3: 380. 1909. TYPE: Brazil. Goiás: entre Paranaua et Rajadinho, 31 Jun. 1895, *Glaziou 21675* (lectotype, P (MacLeish, 1985a); isolectotypes, BR, C, 2 in F, 2 in G, GH) = *Chresta exsucca* DC.
 17. *Eremanthus leucodendron* Mattf., Bot. Gart. Notizbl. 9: 378. 1925. TYPE: Brazil. Bahia: Rio de Contas, Serra das Almas, Carrasco, *Luetzelburg 242* (holotype, M; isotypes, F (photo of B), 2 in GH (includes photo of B), M, TEX (photo of B)) = *Vernonia leucodendron* (Mattf.) MacLeish (1984b).
 18. *Eremanthus martii* (DC.) Baker in C. Martius, Fl. Bras. 6(2): 167. 1873. *Stachyanthus martii* DC., Prodr. 5: 84. 1836. TYPE: Brazil. Bahia: siccis sylvis aestu aphyllis, ad Juazeiro, *Martius s.n.* (holotype, M; isotypes, 3 in M) = *Argyrovernonia martii* (DC.) MacLeish (1984a).
 19. *Eremanthus mollis* Schultz-Bip., Jahresber. Pollichia 18–19: 166. 1861, non *Vernonia mollis* Kunth, Nov. Gen. & Sp. 4: 36. 1820. TYPE: Brazil. Goiás: Montes Claros et Ponte Alto, ante Bomfim, *Pohl 171* (lectotype, W (MacLeish, 1984b); isolectotype, 2 in F (fragment and photo of B), GH (photo of B), 2 in NY, TEX (photo of B)) = *Vernonia pannosus* (Baker in C. Martius) MacLeish (1984b).
 20. *Eremanthus pabstii* G. Barroso, Sellowia 16: 173. 1964. TYPE: Brazil. Goiás: Cristalina, *Heringer 9229/1442* (holotype, HB; iso- types, RB, UB) = *Vernonia pabstii* (G. Barroso) MacLeish (1984b).
 21. *Eremanthus pannosus* Baker in C. Martius, Fl. Bras. 6(2): 164. 1873. TYPE: Brazil. Goiás: Curralinho, *Manso 1* (holotype, BR) = *Vernonia pannosus* (Baker in C. Martius) MacLeish (1984b).
 22. *Eremanthus pinnatifidus* Philipson, Kew Bull. 1938: 299. 1938. TYPE: Brazil. Rio de Janeiro: env. de Rio de Janeiro, *Glaziou 14033* (lectotype, C (MacLeish, 1985a)) = *Pycnocephalum pinnatifidum* (Philipson) MacLeish (1985a).
 23. *Eremanthus plantaginifolius* (Less.) Baker in C. Martius, Fl. Bras. 6(2): 168. 1873. *Vernonia plantaginifolius* Less., Linnaea 4: 251. 1829. TYPE: Brazil: no other data, *Sellow s.n.* (lectotype, P (MacLeish, 1985a)) = *Pycnocephalum plantaginifolium* (Less.) DC.
 24. *Eremanthus purpurascens* Glaz. ex Oliver, Hooker's Icon. Pl. 4(3): plate 2282. 1894. TYPE: Brazil. Minas Gerais: Serra do Cipó, *Glaziou 19464* (holotype, P; isotypes, BR, C) = *Prestelia eriopus* Schultz-Bip.
 25. *Eremanthus pycnocephalus* (DC.) Baker in C. Martius, Fl. Bras. 6(2): 166. 1873. *Chresta pycnocephala* DC., Prodr. 5: 85. 1836. TYPE: Brazil. Minas Gerais: campis deserti inter Min. Nov. et f. S. Francisci, *Martius s.n.* (holotype, M) = *Chresta pycnocephala* DC.
 26. *Eremanthus reflexo-auriculatus* G. Barroso, Rodriguesia 23–24: 6. 1962. TYPE: Brazil. Pernambuco: Buique, Chapada de S. José, *Lima s.n.* (holotype, RB) = *Paralychnophora reflexoauriculata* (G. Barroso) MacLeish (1984a).
 27. *Eremanthus rivularis* Taubert, Bot. Jahrb. Syst. 21: 453. 1896. TYPE: Brazil. Goiás: regio de Maranhão superior, *Ule 26 (2962)* (holotype, HBG, not seen; isotypes, 2 in F (fragment and photo of P), GH (photo of P), P) = *Pycnocephalum angustifolium* (Gardner) MacLeish (1985a).
 28. *Eremanthus scapigerus* (Less.) Baker in C. Martius, Fl. Bras. 6(2): 168. 1873. *Vernonia scapigera* Less., Linnaea 4: 250. 1829. TYPE: Brazil: no other data, *Sellow s.n.* (lectotype, B (MacLeish, 1985a); isolectotypes, K, P) = *Chresta scapigera* (Less.) Gardner.
 29. *Eremanthus schwackei* Glaz., Bull. Soc. Bot. France 3: 380. 1909. TYPE: Brazil. Minas Gerias: Biribiry, *Glaziou 19562* (lectotype, here designated, P; isolectotypes, BR, C, G)

- = *Paralychnophora schwackei* (Glaz.) MacLeish (1984a).
30. *Eremanthus speciosus* (Gardner) Baker in C. Martius, Fl. Bras. 6(2): 169. 1873. *Chresta speciosa* Gardner, London J. Bot. 1: 240. 1842. TYPE: Brazil. Goiás: dry campos near Villa de Arrayas, Gardner 3801 (holotype, BM; isotype, BM) = *Glaziavianthus speciosus* (Gardner) MacLeish (1985b).
31. *Eremanthus sphaerocephalus* (DC.) Baker in C. Martius, Fl. Bras. 6(2): 167. 1873. *Chresta sphaerocephala* DC., Prodr. 5: 85. 1836. TYPE: Brazil. Minas Gerais: Tejuco (now Diamantina), Vauthier 294 (lectotype, G-DC (as IDC microfiche, MacLeish, 1985a); isolectotypes, G, GH) = *Chresta sphaerocephala* DC.
32. *Eremanthus sphaerocephalus* (DC.) Baker in C. Martius var. *intermedia* (Gardner) Baker in C. Martius, Fl. Bras. 6(2): 167. 1873. *Chresta intermedia* Gardner, London J. Bot. 5: 235. 1846. TYPE: Brazil. Minas Gerais: near Formigas (now Montes Claros), Gardner 4818 (holotype, BM) = *Chresta sphaerocephala* DC.
33. *Eremanthus veadeiroensis* H. Robinson, Phytologia 45: 94. 1980. TYPE: Brazil. Goiás: Chapada dos Veadeiros, ca. 20 km N of Alto Paráiso, Irwin et al. 32752 (holotype, UB; isotype, US) = *Vernonia veadeiroensis* (H. Robinson) MacLeish (1984b).
34. *Eremanthus verbascifolius* (C. Martius ex DC.) Schultz-Bip., Jahresber. Pollichia 20–21: 397. 1863. TYPE: Brazil. Minas Gerais: ferruginosis Serra do Ant. Pereira, Martius s.n. (holotype, M) = *Vernonia crotonoides* (DC.) Schultz-Bip.
35. *Vanillosmopsis bicolor* (DC.) Schultz-Bip., Jahresber. Pollichia 18–19: 168. 1861. *Albertinia bicolor* DC., Prodr. 5: 81. 1836. TYPE: Brazil. Minas Gerais: altis, Martius s.n. (holotype, M; isotype, M) = *Paralychnophora bicolor* (DC.) MacLeish (1984a).
36. *Vanillosmopsis lanceolata* (Vell. Conc.) Kuntze, Rev. Gen. Pl. 3(2): 183. 1898. *Chresta lanceolata* Vell. Conc., Arq. Mus. Nac. Rio de Janeiro 8: 350. 1881. TYPE: Brazil: mediterraneis transalpinus prope pagum Cunha, Velloso s.n. (lectotype, as figure, Fl. Flum. Ic. 8: tab. 151. 1831 (MacLeish, 1985a)) = Identity doubtful.
37. *Vanillosmopsis syncephala* Schultz-Bip., Jahresber. Pollichia 18–19: 168. 1861, non *Vernonia syncephala* Schultz-Bip. ex Baker in C. Martius, Fl. Bras. 6(2): 64. 1873. TYPE: Brazil: no other data, Sellow 948 (holotype, B (destroyed); photos of B, F, GH) = *Vernonia crispa* (Mattf.) MacLeish (1984b).
38. *Vanillosmopsis weberbaueri* Hieron., Bot. Jahrb. Syst. 40: 352. 1908, non *Vernonia weberbaueri* Hieron., Bot. Jahrb. Syst. 40: 354. 1908. TYPE: Peru: propre Ramospata in via a Sandia ad Chunchusmayo, Weberbauer 1324 (lectotype, NY, photo of B (MacLeish, 1984b); isolectotypes, photos of B, GH, TEX) = *Vernonia ramospatana* MacLeish (1984b).

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